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Closing the Evidence-Practice Gap: Developing a Behaviour Change Intervention in Post-Stroke Aphasia Management

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Abstract

Aphasia is common post-stroke, and has significant negative effects on quality-of life and functional communication in the long term. While there are high quality clinical practice guidelines available to guide speech pathologists' aphasia management practices, there is variation in the services that people with aphasia are offered. This variation in practice leads to evidence practice gaps in aphasia care. Evidence practice gaps can be closed by applying behaviour change interventions to health professionals who deliver care.

The overarching objective of this thesis was to investigate speech pathologists' implementation of clinical practice guideline recommendations in the management of post-stroke aphasia, and design and evaluate a behaviour-change intervention aimed at improving speech pathologists' practice. The research in this thesis involved four serial phases, whereby the outcomes of each phase informed the subsequent phase. The aim of Phase I was to identify aphasia recommendations from high quality clinical practice guidelines. Phase II aimed to prioritise the evidence-practice gaps in aphasia rehabilitation. The aim of Phase III was to describe speech pathologists' current practice and identify the barriers and facilitators to meeting guideline recommendations in aphasia management. This process identified the theoretical domains that should be targeted by an implementation intervention. Phase IV used a small cluster randomised controlled trial to design, pilot and test an acceptable, feasible, and effective implementation intervention. A secondary aim of Phase IV was to determine whether the implementation intervention was successful in addressing the hypothesised predictors of behaviour.

In Phase I, a systematic review was used to identify and evaluate clinical practice guidelines relevant to post-stroke aphasia rehabilitation, and evidence-based recommendations were identified. This was an update of a previous systematic review, and identified and assessed the quality of clinical practice guidelines published since April 2012. Following the identification of high quality Clinical Practice Guidelines, recommendations relevant to aphasia management were extracted and categorised according to the area of practice (e.g., assessment, treatment). The identified clinical guideline recommendations were evaluated according to the applicability of the underlying evidence to speech pathology practice, and whether the recommendation could be clearly linked to the underlying evidence. Recommendations from four high-quality clinical practice guidelines relevant to aphasia management were extracted. From these guidelines, 34 evidence-based recommendations were identified.

Since 34 recommendations would be difficult to implement by any aphasia service, the targets of implementation efforts needed to be prioritised. In Phase II, a scoping search was used to identify the implementation priorities in post-stroke aphasia. Seven priority-setting criteria were identified in the implementation literature: strength of the evidence; current evidence-practice gap; clinician preference; client preference; modifiability; measurability; and health impact. These criteria were applied to the 34 aphasia recommendations categorised into 13 topic areas. Using systematised searches, evidence was identified and extracted for each criterion per topic area. This evidence was extracted and placed in an evidence matrix. Following this, evidence was summarised, then aphasia rehabilitation topics prioritised using an approach developed by the research team. Four implementation priorities were identified: *Timing, Amount and Intensity of Therapy*; *Goal Setting; Information, Education and Aphasia-friendly information*; and *Constraint-Induced Language Therapy*.

To determine the barriers and facilitators to implementing these priorities, semi-structured interviews were conducted with 20 hospital-based speech pathologists in two Australian states in Phase III. The Theoretical Domains Framework was used to categorise their responses. The domains of 'Environmental Context and Resources', 'Beliefs about Consequences', and 'Social Influences' were identified as key influencing factors for all topic areas. For those speech pathologists working only in inpatient rehabilitation settings, the majority of recommended behaviours were reportedly performed consistently, with few implementation barriers identified. However, for clinicians working in the acute setting, the majority of behaviours were performed inconsistently or rarely. The findings from the study provided a basis for the development of a behaviour-change intervention that could be tailored to address the identified barriers. Furthermore, the results indicated that an intervention targeting acute clinicians was a priority, due to the reported inconsistencies in their practice and the number of barriers reported.

In Phase IV, participants from four speech pathology teams in acute hospitals received an intervention targeted at one of two target behaviours: *Information, Education and Aphasia-friendly information;* and *Collaborative Goal Setting*. The interventions were developed by mapping the known barriers to intervention functions using the Behaviour Change Wheel, and were delivered to teams in a single, face-to-face interactive workshop. While significant improvements were seen in the two teams that received the Information Provision intervention, there was no significant change in the teams that received the Goal Setting intervention. Factors that may have influenced success included: buy-in from participants, the organisational culture, and the complexity of the behaviour requiring change. Surveys, used to measure the effect of the interventions in overcoming the

barriers, showed a positive change in some but not all of the targeted domains, highlighting the need for sensitive outcome measures in this area and further research into *how* behaviour change occurs.

Overall this study showed that a tailored, theoretically informed implementation intervention was feasible, acceptable and potentially effective in changing speech pathologists' management of people with aphasia in the acute hospital setting. However more research is needed into the 'essential' components of a successful intervention. In addition, future research needs to include patient-oriented outcome measures to show that implementation efforts can improve outcomes for people with aphasia.

Declaration by author

This thesis is composed of my original work, and contains no material previously published or written by another person except where due reference has been made in the text. I have clearly stated the contribution by others to jointly-authored works that I have included in my thesis.

I have clearly stated the contribution of others to my thesis as a whole, including statistical assistance, survey design, data analysis, significant technical procedures, professional editorial advice, and any other original research work used or reported in my thesis. The content of my thesis is the result of work I have carried out since the commencement of my research higher degree candidature and does not include a substantial part of work that has been submitted to qualify for the award of any other degree or diploma in any university or other tertiary institution. I have clearly stated which parts of my thesis, if any, have been submitted to qualify for another award.

I acknowledge that an electronic copy of my thesis must be lodged with the University Library and, subject to the policy and procedures of The University of Queensland, the thesis be made available for research and study in accordance with the Copyright Act 1968 unless a period of embargo has been approved by the Dean of the Graduate School.

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Publications during candidature

Peer-Reviewed Papers

1. **Shrubsole**, Worrall, Power, & O'Connor. (2018). Barriers and facilitators to meeting aphasia guideline recommendations: What factors influence speech pathologists' practice? *Disability and Rehabilitation*, Early Online (DOI: 10.1080/09638288.2018.1432706).
2. **Shrubsole**, Worrall, Power, & O'Connor. (2017). Priorities for closing the evidence-practice gaps in post-stroke aphasia rehabilitation: A scoping review. *Archives of Physical Medicine and Rehabilitation*; In Press (DOI: 10.1016/j.apmr.2017.08.474).
3. **Shrubsole**, Worrall, Power & O'Connor. (2016). Recommendations for post-stroke aphasia rehabilitation: An updated systematic review and evaluation of clinical practice guidelines. *Aphasiology*; 1-24 (DOI:10.1080/02687038.2016.1143083).
4. Worrall, Brandenburg & **Shrubsole.** (2016). Neuroscientific implications in assessment and intervention for aphasia. *Folia Phoniatr Logop*; 67:285-292 (DOI:10.1159/000444751).

Conference Abstracts

1. **Shrubsole**, Worrall, Power & O'Connor. (2017, August). Closing the evidence-practice gaps in acute aphasia management: A program of research. Paper presented at the Smart Strokes Conference, Gold Coast, Australia.

2. **Shrubsole**, Worrall, Power & O'Connor. (2017, May). Closing the evidence-practice gaps in acute aphasia management: What works? Results of a pilot cluster randomised control trial. Paper presented at the Speech Pathology Australia Conference, Sydney, Australia.

3. **Shrubsole**, Worrall, Power & O'Connor. (2017, May). What are the barriers to meeting aphasia guideline recommendations? Results of an interview study. Paper presented at the Speech Pathology Australia Conference, Sydney, Australia.

4. **Shrubsole**, Worrall, Power & O'Connor. (2016, December). Barriers and facilitators to implementing best practice recommendations in post-stroke aphasia management. Paper presented at the 17th International Aphasia Rehabilitation Conference (IARC), London, UK.

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9. **Shrubsole**, Worrall, Power & O'Connor. (2013, November). Barriers and facilitators to closing the evidence-practice gap in post-stroke aphasia management: A study protocol. Paper presented at The University of Queensland Postgraduate Research Conference, Brisbane, Australia.

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Contributor	**Statement of contribution**
Author: Kirstine Shrubsole (Candidate)	Study design (30%) Data analysis (70%) Wrote the paper (100%)
Author: Professor Linda Worrall	Study design (30%) Data analysis (10%) Edited paper (35%)
Author: Dr Emma Power	Study design (20%) Data analysis (10%) Edited paper (35%)
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Author: Dr Emma Power	Study design (20%)

	Data analysis (10%)
	Edited paper (35%)
Author: Dr Denise O’Connor	Study design (20%)
	Data analysis (10%)
	Edited paper (30%)

Contributions by others to the thesis

The PhD candidate was primarily responsible for the literature review, refining the design of the studies, gaining ethical approval, participant recruitment, data collection, data analysis and manuscript preparation.

Professor Linda Worrall, Dr Emma Power and Dr Denise O'Connor had substantial input in the conceptual development and design of this research project. Professor Linda Worrall, Dr Emma Power and Dr Denise O'Connor also had substantial input in the critical appraisal of written work, and completion and interpretation of data analysis.

To the best of my knowledge and belief, no person who has offered contributions consistent with the above has been excluded as an author. Persons who have contributed to the work but not at the level which constitutes authorship have been acknowledged in the text.

Statement of parts of the thesis submitted to qualify for the award of another degree

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But most importantly, I would like to thank and acknowledge the people with aphasia who I have had the privilege to work with. It is because of you that I am here, and that I will continue to work with clinicians and health organisations to improve the services that you receive. There is one incident in particular that changed things for me, and led me down this path of completing my PhD. When I started a new clinical position back in 2008, I noticed there was a gentleman with aphasia in the rehabilitation ward – his name was Ben. I wondered why we weren't seeing Ben for speech therapy, and was told we didn't have funding for that ward. I looked through his medical chart and saw he had been in hospital for months, and would soon be going home – without ever having language intervention. So, against departmental policy, I began to see him on the ward – much to the surprise of the rehabilitation staff – and, when he was discharged, I saw him as an outpatient for over a year. Sadly, Ben's communication never really improved. He could occasionally say some single words, like 'Yes' or 'Bye', but he could never again verbally communicate his wants, needs, feelings, or dreams. I have always felt that we, the speech pathology profession, failed Ben. But this feeling wasn't shared by all of my colleagues, and for a time, I was despondent about the future for people with aphasia. What was the point of having evidence of effective treatments if it wasn't being implemented? I considered leaving the profession, but I realised that wasn't going to help people with aphasia, either. It took a little while – a marriage, a move interstate, the birth of my first child - but eventually I found my way to Linda, The University of Queensland, and The Centre for Clinical Research Excellence in Aphasia. I now feel confident that, with leadership and more research into this important topic of implementation, we *can* improve services for people with aphasia, so that hopefully what happened to Ben, will never happen to another person with aphasia in this country.

Keywords

aphasia, implementation, knowledge translation, evidence-practice gap, rehabilitation, speech-language pathology, behaviour change.

Australian and New Zealand Standard Research Classifications (ANZSRC)

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Fields of Research (FoR) Classification

FoR code: 1103 Clinical Sciences 100%

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List of Abbreviations used in the thesis

AAC	Augmentative and Alternative Communication
AGREE	Appraisal of Guidelines and Research and Evaluation
ASU	Acute stroke unit
AustCGSM	Australian Clinical Guidelines for Stroke Management
Aust/NZCGSM	Australian/New Zealand Clinical Guidelines for Stroke Management
BCW	Behaviour Change Wheel
BSpPath	Bachelor of Speech Pathology
CALD	Culturally and Linguistically Diverse
CCRE	Clinical Centre for Research Excellence
CILT	Constraint Induced Language Therapy
COM-B	Capability, Opportunity, Motivation and Behaviour
CONSORT	Consolidated Standards of Reporting Trials
COREQ	Consolidated Criteria for Reporting Qualitative Research
CPG	Clinical Practice Guideline
CPT	Conversation Partner Training
DO	Denise O'Connor
DOI	Diffusion of Innovation
EP	Emma Power
EPOC	Effective Practice and Organisation of Care
FTE	Full-time equivalent
GRADE	Grading of Recommendations Assessment, Development and Evaluation
Hons1	First Class Honours
HP	Health professional
HREC	Human Research Ethics Committee
ID	Identity
KT	Knowledge Translation
KTA	Knowledge-To-Action
KTE	Knowledge Transfer and Exchange
KS	Kirstine Shrubsole
LiSP	Leaders in Speech Pathology
LW	Linda Worrall
Max	Maximum
Min	Minimum
MDT	Multidisciplinary team

NICE	National Institute for Health and Care Excellence
NHMRC	National Health and Medical Research Council
n/r	No response
NSW	New South Wales
NZCGSM	New Zealand Clinical Guidelines for Stroke Management
PARiHS	Promoting Action on Research Implementation in Health Services
PDF	Portable document format
PEMs	Printed Educational Materials
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PsycBITE	Psychological database for Brain Impairment Treatment Efficacy
QLD	Queensland
QUAL	Qualitative
RCSLT	Royal College of Speech and Language Therapists
RCT	Randomised controlled trial
RE-AIM	Reach, Efficacy, Adoption, Implementation and Maintenance
SD	Standard deviation
SDM	Shared Decision-Making
SIGN	Scottish Intercollegiate Guidelines Network
SLP	Speech-Language Pathologist
SP	Speech pathologist
SPECs	Speech Pathology Email Chat
StaRI	Standards for Reporting Implementation
TIA	Transient Ischaemic Attack
TIDieR	Template for Intervention Description and Replication
TDF	Theoretical Domains Framework
TPB	Theory of Planned Behaviour
UK	United Kingdom
USA	United States of America
WIDER	Workgroup for Intervention Development and Evaluation Research

Chapter 1: Introduction

1.1 Background

Aphasia is an acquired language disorder caused by damage to the language centres of the brain, most commonly due to stroke (Berthier, 2005). It can affect all aspects of communication, including verbal and written expression, and auditory and reading comprehension, with varying degrees of severity (Code & Herrmann, 2003). Aphasia is one of the most common consequences of stroke, occurring in up to 38% of stroke survivors (Berthier, 2005). Post-stroke aphasia is associated with increased mortality and reduced rates of functional recovery compared to stroke survivors without aphasia (Engelter et al., 2006). While it has been estimated that approximately 40% of people with acute aphasia experience complete or almost complete recovery by one-year post stroke, the majority of people with aphasia live with long-lasting difficulties (Ferro, Mariano, & Madureira, 1999; Kertesz & McCabe, 1977).

The long-term effects of aphasia are significant, and aphasia can have a substantial negative impact on psychological well-being and quality-of-life (Cruice, Worrall, Hickson, & Murison, 2003; Engelter et al., 2006; Hilari et al., 2010). People with a post-stroke communication problem are significantly more likely to report negative changes in work activities, leisure activities, and relationships with family and friends, than stroke survivors without communication impairments (McKevitt et al., 2011).

Despite the often chronic nature of aphasia, research has shown that speech therapy is beneficial beyond spontaneous recovery, with treated individuals having almost twice the recovery of untreated individuals when therapy is commenced within the first 3-months post-stroke (Brady, Kelly, Godwin, & Enderby, 2012; Robey, 1998). Evidence exists for a range of treatment approaches to improve language or communication function that cover the World Health Organization's International Classification of Functioning, Disability and Health (2001), including direct treatment approaches (e.g., Constraint Induced Language Therapy (Cherney, Patterson, Raymer, Frymark, & Schooling, 2008)) and treatments that target the communicative environment (e.g., conversation partner training (Simmons-Mackie, Raymer, Armstrong, Holland, & Cherney, 2010).

It is essential that speech pathologists use the best available evidence to guide their practice, so they can provide the most effective treatments that will result in the best patient outcomes (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996). Evidence-based practice arose from the

need to be accountable for clinical decisions using up-to-date evidence and rationales for treatment, rather than traditional methods of relying of previous experience and advice from colleagues alone (Hoffmann, Bennett, & Del Mar, 2009). Several studies have shown that while evidence-based practice is a high priority for speech pathologists, time constraints and other barriers can make it difficult to keep up-to-date with the evidence (Dodd, 2007; O'Connor & Pettigrew, 2009; Zipoli & Kennedy, 2005). Keeping up to date with the literature involves searching for and accessing the evidence, then appraising the research before making a decision about whether it is appropriate and feasible to implement (Hoffmann et al, 2009). Clinicians may face challenges at any one of these steps, and the increasing volume of research is an additional barrier, with medical and healthcare research output doubling every seven years (Tsay & Yang, 2005).

A common way of overcoming the barriers associated with keeping up to date with the literature, is by packaging and disseminating appraised evidence to clinicians through knowledge synthesis tools such as Clinical Practice Guidelines. Clinical Practice Guidelines (CPGs), defined by the Institute of Medicine (Field & Lohr, 1990) as 'systematically developed statements to assist practitioner decisions about appropriate health care for specific clinical circumstances', aim to standardise processes of care with the overarching aim of improving patient outcomes (Straus, Tetroe, & Graham, 2009). The use of CPGs by allied health professionals has been shown to be effective in changing the processes and outcomes of care (Thomas et al., 2009), and is also associated with better post-stroke recovery outcomes (Hubbard et al., 2012). CPGs are frequently used and highly regarded by Australian speech pathologists, with over 95% of survey respondents reporting that stroke guidelines were "somewhat" or "very" useful (Hadely, Power, & O'Halloran, 2014).

However, although CPGs are able to overcome some of the barriers related to keeping up to date with the evidence, they, in themselves, do not assist clinicians in *implementing* the evidence. Despite the known benefits of CPGs and their perceived usefulness, there is a lack of adherence to the guideline recommendations, which results in inconsistencies in the services and treatments that people with aphasia are offered. For example, an Australian rehabilitation audit of stroke guideline adherence found 58% adherence to all aphasia recommendations (Hubbard et al., 2012). Additionally, when treatment is provided, often the amount of therapy provided is significantly less than what is recommended. For example, one acute hospital audit demonstrated that 75% of people with aphasia who were appropriate candidates for aphasia therapy did not receive any intervention for the duration of their in-hospital stay (Godecke, Hird, Lalor, Rai, & Phillips, 2011).

Furthermore, this same audit showed that even when patients with aphasia *did* receive treatment, the amount was insufficient at an average of only 14 minutes per week (Godecke et al, 2011).

This 'gap' between what is shown to be effective in research and what actually occurs in practice, is termed the *evidence-practice gap*. Evidence-practice gaps have been demonstrated in many areas of healthcare and can result in suboptimal care (Grimshaw, Eccles, Lavis, Hill, & Squires, 2012). A landmark study by McGlynn and colleagues (2003) found that patients in the US received guideline-recommended care on average 55% of the time. A decade later, these findings were replicated in Australia, where recommended care was received on average 57% of the time for healthcare encounters (Runciman et al., 2012). The reasons for this lack of adherence to evidence-based recommendations are complex, and may include individual, organisational, political and economic barriers (Grol & Wensing, 2004; Rainbird, Sanson-Fisher, Buchan, & National Institute of Clinical Studies, 2006).

Research areas of 'Knowledge Translation' and 'Implementation' have evolved from a recognition of, and need to reduce, these evidence-practice gaps. Knowledge Translation is a broad and complex field of research with many aspects, that, when applied in a thorough and rigorous manner, can result in improvements to clinical behaviour and practice, and improve patient outcomes (Graham et al., 2006; Grimshaw et al., 2012). Implementation is a related term that applies to the process of implementing knowledge into practice, often by focussing on changing healthcare practitioners' behaviour (Grimshaw et al., 2012). Implementation Science is the process of improving the uptake of evidence into practice, focusing explicitly on the use of theory to design behaviour change interventions to improve patient care (Estabrooks, Thompson, Lovely, & Hofmeyer, 2006; Graham et al., 2006).

A substantial and growing body of evidence about the effects of implementation strategies is available to inform the selection and design of implementation activities to close evidence-practice gaps (Grimshaw et al., 2015; Grimshaw et al., 2012). Implementation interventions targeted at known barriers have been shown to be more effective than non-tailored interventions or passive guideline dissemination (Baker et al., 2015; Baker et al., 2010). Therefore, it is important to have an understanding of the factors influencing clinicians' practice, in order to develop interventions to modify health professionals' behaviour and improve evidence uptake (Baker et al., 2010; Graham et al., 2006; Grol & Wensing, 2004).

Despite these advancements, there are many uncertainties in the implementation literature. There is little strong evidence supporting the use of one intervention over another, and little evidence

to show which interventions are most effective for a specific setting (Grimshaw et al., 2006; Grol & Grimshaw, 2003). In addition, there is uncertainty about *how* to tailor interventions to address the known barriers (Baker et al., 2010). It has been argued that future research into the effectiveness of implementation interventions should explicitly identify the rationale for the interventions, focusing on greater use of theory to understand barriers and design interventions (French et al., 2012; Scott et al., 2012). In addition, there is a need for improved reporting of interventions so that findings of these studies can be understood and replicated (Albrecht, Archibald, Arseneau, & Scott, 2013). Another question that has yet to be answered by the implementation literature, is how to determine which evidence-practice gap to address. In a healthcare environment of competing demands and finite resources, careful selection of implementation targets is important. This concept of prioritising implementation efforts has been examined in only a few studies (e.g. Bayley et al, 2014; Farley, Thompson, Hanbury, & Chambers, 2013) and requires further investigation.

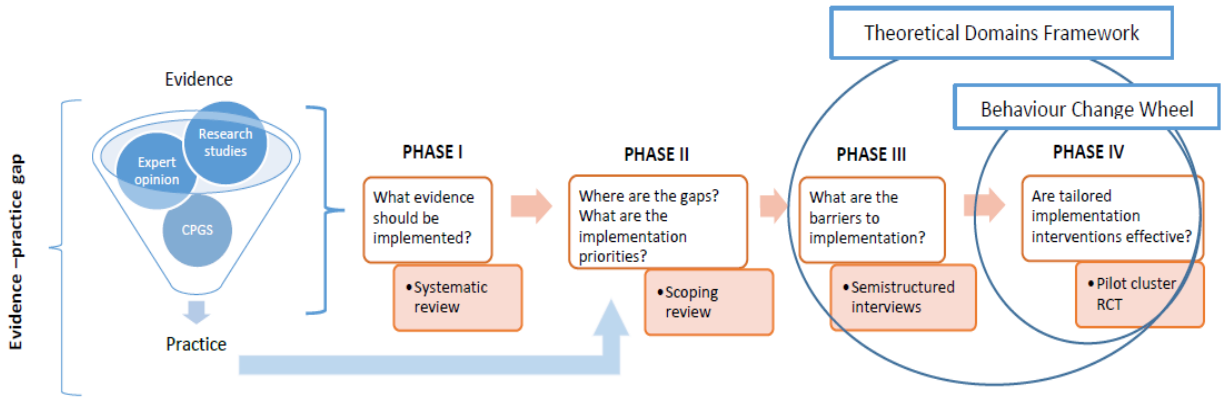
Although Knowledge Translation and Implementation research in healthcare has a growing profile, there has been limited application of this research in the field of post-stroke aphasia. To date, only four published implementation studies exist in aphasia. These studies all had a focus on improving communicative access for people with aphasia, and included staff training in supported conversation techniques (Horton, Clark, Barton, Lane, & Pomeroy, 2016; Jensen et al, 2015; Simmons-Mackie et al, 2007; Wielaert, Van de Sandt-Koenderman, Dammers, & Sage, 2016). While the results of these studies were mostly positive, outcome measures were predominantly based on self-report. Self-report measures are subject to bias, and have been shown to overestimate clinician's adherence when compared to objective measures in the broad healthcare context (Adams, Soumerai, Lomas, & Ross-Degnan, 1999). As such, it is not certain whether actual change in clinical practice occurred in any of these implementation studies. Furthermore, these studies lacked any reported theoretical basis for the selection of their intervention techniques, and did not prospectively design the intervention to address known barriers to implementation. The lack of theory makes it difficult to determine *how* behaviour change occurred. Finally, only two of the aphasia implementation studies (Simmons-Mackie et al, 2007; Wielaert et al., 2016) reported on outcomes relating to *speech pathologists'* practice, as opposed to nursing staff (Jensen et al, 2015) or other members of the multidisciplinary team (Horton et al., 2016). Hence, there is still limited understanding of *which* behaviour change interventions are effective in improving speech pathologist's aphasia management practices, the *nature* of the implementation process, and the *feasibility* issues of implementation for speech pathologists.

Moreover, while there is evidence of several evidence-practice gaps in aphasia practice, there has been limited research into understanding the foundations of the lack of adherence though examination of barriers faced by clinicians in providing aphasia management. This research has occurred more broadly in speech pathology practice post-stroke (Hadely et al, 2014; Miao, Power & O'Halloran, 2015). It is necessary to understand these barriers and facilitators, so that evidence-practice gaps can be effectively addressed through the development of targeted, theory-informed, implementation interventions (Baker et al., 2010; Graham et al., 2006).

There is a need to increase implementation efforts in aphasia, so that the many evidence-practice gaps can be addressed and reduced. Ultimately, this will improve aphasia services. Thus, speech pathologists' implementation of clinical practice guideline recommendations in the management of post-stroke aphasia forms the topic of investigation described in this thesis.

1.2 Study Aims

The overarching objective of this thesis was to investigate speech pathologists' implementation of clinical practice guideline recommendations in the management of post-stroke aphasia. The research phases are presented in Figure 1-1.



The specific aims of this thesis were:

- To extract and synthesise recommendations with the highest levels of evidence from the highest quality aphasia clinical practice guidelines, in order to determine which guideline recommended practices are relevant to speech pathologists and need to be implemented (Phase I);
- To identify priorities for implementation in aphasia rehabilitation based on criteria and evidence from the literature (Phase II);

- To identify the perceived barriers and facilitators to implementing these priorities for speech pathologists working with people with aphasia in an inpatient setting, in order to identify which theoretical domains should be targeted by an implementation intervention (Phase III); and
- To design, pilot and test the acceptability, feasibility, and potential effectiveness of a theoretically-informed implementation intervention aimed at improving speech pathologist's aphasia management practices using a cluster randomised control trial (Phase IV).

1.3 Overview of Thesis

This Chapter has introduced the topics and aims of the thesis and provided a thesis overview. **Chapters 2 and 3** of this thesis expand on the background literature surrounding this study and provide a critical review of relevant literature that has informed the development of this research program. **Chapter 2** introduces the concept of implementation science and several related theories and models of behaviour change, and reviews and critiques various types of behaviour change interventions and methodological approaches. In **Chapter 3**, the application of implementation interventions to stroke, rehabilitation and speech pathology are discussed. In addition, the context for implementation in aphasia research is introduced. Chapters 2 and 3 are traditional thesis chapters.

Chapter 4 addresses the first thesis aim and presents the results of a systematic review of the aphasia and general stroke rehabilitation recommendations arising from high quality Clinical Practice Guidelines. The quality of included Clinical Practice Guidelines was appraised to identify 'high quality' guidelines using the AGREE II instrument. This chapter explores the challenges associated with synthesising and appraising research evidence applicable to people with aphasia, and the clinical implications for speech pathologists who provide post-stroke aphasia management. The chapter has been published in the journal *Aphasiology*.

Chapter 5 addresses the second thesis aim and outlines the methodology and presents findings from a scoping review that applied a novel decision-making process to identify priorities for implementation in aphasia management. It centres of the question of how, when faced with potentially many implementation options, we can have a rigorous process to help identify the priorities for implementation. This study has been accepted for publication in the journal *Archives of Physical Medicine and Rehabilitation*.

Chapter 6 addresses the third thesis aim and presents findings from qualitative interviews describing speech pathologist's perceptions of the factors (barriers and enablers) influencing their

practice in priority implementation areas of aphasia management. The chapter describes the methodology, analysis and results of this study, and identifies the main theoretical domains that could potentially be targeted in an implementation intervention. This study has been submitted for publication and is currently under review.

Chapter 7 addresses the fourth thesis aim and presents the results of a pilot randomised control trial investigating a tailored implementation intervention to improve speech pathologist's aphasia management practices in the acute hospital setting. It focusses on whether a tailored, theoretically-informed, implementation intervention is feasible, acceptable and potentially effective in improving speech pathologists' practice, and explores the potential mechanisms of change as they relate to theory. The manuscript comprising this chapter is being prepared for journal submission.

Chapter 8 is a traditional thesis chapter that provides an overall summary of results, clinical implications, limitations and directions for future research.

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Chapter 2: Knowledge Translation and Implementation

"Health work teaches us with great rigour that action without knowledge is wasted effort, just as knowledge without action is a wasted resource."

Lee Jong-Wook, former Director-General of the World Health Organization, 2005

Knowledge Translation (KT) is the process of improving the uptake of knowledge, or evidence, into practice, with the ultimate aim of improving clinical outcomes. It arose from the recognition of a *gap* between research findings and clinical practice, which has been identified in numerous studies worldwide. KT is recognised as an important healthcare issue nationally, internationally and globally, with large-scale efforts underway to close these evidence-practice gaps. This chapter will provide an overview of KT and its various associated terminologies, theories and intervention components, review and critique the key models and frameworks that may be applied to knowledge translation efforts, and identify the key principles of knowledge translation that are supported by research, in order to establish the methodological approaches that should be used in a program of implementation research.

2.1 Terminology

Knowledge Translation refers to the process of implementing evidence or knowledge into clinical practice. Ultimately, KT refers to the collection, summation, and packaging of research knowledge and its delivery in a timely and appropriate format (Graham et al., 2006; Grimshaw, Eccles, Lavis, Hill, & Squires, 2012). As KT has evolved over time to reflect the complex nature of changing behaviours, so have the definitions and terminology used to describe this area of research. A review of the literature revealed 581 articles related to KT in 2006 alone, and identified over 100 terms relating to Knowledge Translation (McKibbon et al., 2010). Although they are often similar in meaning, these terms may have different areas of focus, for example relating more closely to research distribution or research application. In order to establish the key terminology used throughout this thesis, the most commonly used terms are described below.

Several terms focus on the process of distributing research knowledge, such as *knowledge transfer and exchange* (KTE), which refers to an ongoing interaction between researchers and user-groups, so that research informs practice, and practice needs are a focus of research (Graham et al., 2006). Some terminology relates more to the application of research findings, such as *Research utilisation, which* refers to the process by which research-based knowledge is implemented into

practice (Estabrooks, Thompson, Lovely, & Hofmeyer, 2006; Graham et al., 2006). *Implementation,* on the other hand, refers to the process of implementing any kind of knowledge into practice, including innovations, tools and research findings (Graham et al., 2006). *Translational research* is the science of moving research into policy and practice, whereby the determinants of knowledge use and methods to promote uptake are investigated (Graham et al., 2006). *Implementation science* is similar to translational research, but focuses explicitly on the use of theory to design behaviour change interventions to improve patient care (Estabrooks et al., 2006).

'*Knowledge translation'* is one of the few terms that incorporates both the dissemination and application of research knowledge. Knowledge translation is defined by the Canadian Institutes of Health Research as "*a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically sound application of knowledge to improve the health of Canadians, provide more effective health services and products and strengthen the health care system,"* (2013).

It can be seen that although there is an array of KT terminology, these definitions have not been standardised. In their review of KT terminology, McKibbon and colleagues found inconsistent use of terms, with less than half of the terms used to describe KT being present in KT articles (2010). Different terms appear to be preferred depending on geographical location. For instance, the terms *implementation science* or *research utilisation* are commonly used in the United Kingdom and Europe, whereas the terms *dissemination, research use,* and *knowledge transfer and uptake* are often used in the United States (Straus, Tetroe, & Graham, 2009b). In Canada, the terms *knowledge transfer and exchange (KTE)* and *knowledge translation* are commonly used (Graham et al., 2006; Grimshaw et al., 2012; Straus et al., 2009b). For this review, the terms '*knowledge translation'* and '*implementation'* will be used, recognising that KT incorporates knowledge transfer and exchange, and the desired outcome is the implementation of research findings into clinical practice.

2.2 The Evidence-Practice Gap

The failure to translate research evidence into clinical practice is commonly known as the '*evidence-practice gap'*. Evidence-practice gaps, whereby uptake of evidence into practice is poor, are consistently found in all areas of healthcare research (Grimshaw et al., 2012; Grol & Grimshaw, 2003). For example, McGlynn and colleagues (2003) observed that patients in the US received, on average, only 55% of recommended care. These findings were replicated in an Australian study where recommended care was received on average 57% of the time for healthcare encounters (Runciman et al., 2012). In stroke care, an Australian audit of practice revealed that only 60% of acute stroke patients received care on a dedicated stroke unit, despite this being a Grade A

recommendation in the *Clinical Guidelines for Stroke Management* (National Stroke Foundation, 2011).

Given the wealth of research that is being published every year, the often slow or absent uptake of evidence is not surprising. It has been estimated that, to maintain current knowledge, general internists would need to read 20 articles each day (Shaneyfelt, 2001). Furthermore, the publication of both randomised trials and systematic reviews are widely scattered across different journals, making it difficult for clinicians to find key evidence from multiple and varied sources (Hoffmann, Erueti, Thorning, & Glasziou, 2012). This difficulty in accessing and keeping up to date with the literature is just one barrier faced by healthcare professionals.

The factors underlying various evidence-practice gaps have been extensively studied. There are numerous barriers and facilitators to research utilisation, which can be categorised into various levels, such as barriers related to the innovation itself, the individual professional, the patient, the social context, the organisational context, and the economic and political context (Grol & Wensing, 2004; Rainbird, Sanson-Fisher, Buchan, & National Institute of Clinical Studies, 2006). A more detailed description of barriers and facilitators to research use can be found further in Section 2.5 of this chapter.

2.3 Models of Knowledge Translation and Implementation

A multitude of knowledge translation models or frameworks have been developed. These models, otherwise known as frameworks, provide a structure to organise knowledge translation efforts, and can be used to describe the knowledge transfer process, and to plan and evaluate interventions to improve practice (Straus, Graham, Taylor, & Lockyer, 2008; Milat & Li, 2017). For the purposes of this review, the terms models and frameworks will be used interchangeably, although others have different definitions (e.g., Nilsen, 2015).

As the field of knowledge translation has evolved, so have the models used to describe the knowledge translation process. Early frameworks were linear, including "push" and "pull" models which involved approaches by either researchers or research users to drive or extract research information respectively, and "exchange" models involving partnerships between researchers and users (Lavis, Lomas, Hamid, & Sewankambo, 2006). Later KT models are more cyclical, or multidirectional, reflecting more dynamic processes of change (Ward, House, & Hamer, 2009). In this section, key features of knowledge translation models will be discussed, and several prominent models will be compared and contrasted, in order to determine which models may be useful in this research program.

2.3.1 *Common Components of Models*

A review of Knowledge Translation literature found 28 models describing the process of KT (Ward et al., 2009). These types of models have been described as 'process models' (Nilson, 2015), aiming to guide the process of knowledge translation, often providing specific steps. Five common KT components were identified from these 28 models.

2.3.1.1 Problem Identification and Communication. This refers to the process of identifying which areas of knowledge are, and are not, being used. Methods to identify these evidence-practice gaps vary, but could include knowledge mapping, audits, and surveys (Kitson & Straus, 2010). While this component was included in only 9 of the 28 models identified in the review, all of these models showed the 'problem' emerging from the clinician's perspective or through a process of exchange, rather than being imposed by researchers (Ward et al., 2009). This focus on clinician-identified problems is important, as it has been recognised that research should be applicable to key stakeholders' identified needs (Lavis, 2006).

2.3.1.2 Knowledge/Research Development and Selection. This component is related to the creation and synthesis of research. The primary form of knowledge synthesis is a systematic review, which summarises all relevant studies on a topic by bringing together existing research findings and identifying common patterns (Straus, Tetroe, & Graham, 2009a). Knowledge syntheses are useful in evaluating the quality of the evidence available to guide practice, improving understanding of inconsistencies in the evidence, and determining areas where evidence is lacking (Kastner et al., 2012). Once evidence has been synthesised, it can then be further refined into clinical practice guidelines, care bundles, or aids for patient decision-making (Straus et al., 2009a). Knowledge synthesis tools are thought to be more user-friendly and accessible to clinicians, and are therefore a common way of disseminating and presenting evidence for the purpose of implementation (Brouwers, Stacey, & O'Connor, 2010).

2.3.1.3 Analysis of Context. This refers to the process of identifying the barriers and facilitators to practice change. This step may include the assessment of individual barriers to evidence uptake, or focus on the organisational, environmental or structural factors that determine the context of KT (Ward et al., 2009). The assessment of barriers and facilitators is described in detail in Section 2.5.3 of this chapter.

2.3.1.4 Knowledge Transfer Activities or Interventions. The next element involves the actual activities or 'interventions' that are implemented in order to change practice. This was the most common component that was identified, present in 26 of the 28 models (Ward et al., 2009).

This step involves implementing an intervention to bring about healthcare behaviour or practice change, which is discussed in more detail later in Section 2.6 of this chapter.

2.3.1.5 Knowledge/Research Utilisation. Some models depicted knowledge utilisation as the goal of KT, and did not include it as a step in the process of KT. Others, however, described this component in more depth, by focusing on monitoring and sustaining knowledge use and assessing its impact (Ward et al., 2009).

2.3.2 *Prominent KT Frameworks*

A recent literature review (Milat et al., 2017) of KT models and frameworks found that, of 41 models identified, several specific frameworks have been more widely and frequently used than others. These models include the RE-AIM (Reach, Efficacy, Adoption, Implementation and Maintenance) framework, the Promoting Action on Research Implementation in Health Services (PARiHS) framework, and the Knowledge-To-Action (KTA) Framework, which are described below. These three models incorporate the main components described above (Section 2.3.1) to different degrees, as shown in Table 2.1.

Table 2-1. Components of Prominent KT Frameworks

Model/ Framework	Identify gap or problem	Select or develop knowledge	Analyse context/ barriers	Knowledge transfer/ Intervention	Utilise knowledge/ Implement
RE-AIM (Glasgow et al, 1999)				✓	✓
PARiHS (Kitson et al., 2008)	✓	✓	✓	✓	✓
KTA Framework (Graham, 2006)	✓	✓	✓	✓	✓

2.3.2.1 RE-AIM (Reach, Efficacy, Adoption, Implementation and Maintenance) framework. The RE-AIM framework, developed by Glasgow and colleagues (1999), proposes that it is essential to collect both individual and program level measures of implementation, so that the extent to which a health promotion practice or policy becomes routine and part of the everyday organisational culture can be evaluated. RE-AIM was found to be the most frequently applied knowledge translation framework in Milat and colleagues' (2017) review, and has been extensively applied in public and population health research. It is an example of Nilsen's (2017) 'evaluation framework'. Despite its acceptance within the public health context, this framework has been criticised for its simplified conceptualisation of 'efficacy', and its limited consideration of the barriers and facilitators to the 'adoption' of an intervention (Milat et al., 2017). In addition, there is

little guidance about how to select the knowledge or innovation that requires implementation, and the framework has not been tested nor validated.

2.3.2.2 Promoting Action on Research Implementation in Health Services (PARiHS). The PARiHS framework, shown in Figure 2-1, characterises successful implementation (SI) as a function (f) of the nature of evidence (E), the qualities of the context (C) and the facilitation of the implementation process (F), represented as SI = f (E, C, F) (Kitson et al., 2008; Seers et al., 2012). The PARiHS framework was the fourth most widely used model in Milat and colleagues' (2017) review. Initiated in the field of nursing research, this model focuses on the organisational context of research use (Colquhoun, Letts, Law, MacDermid, & Missiuna, 2010). A critical analysis of 24 articles found empirical support for PARiHS, with strengths including its flexibility and explicit recognition of the outcome of 'successful implementation' (Helfrich et al., 2010). However, limitations of the framework include its narrow definition of the facilitation concept (Helfrich et al., 2010), and the lack of known studies that have prospectively used the model to design implementation strategies. Therefore, this model's effectiveness in designing an implementation intervention is unknown.

Figure 2-1. Promoting Action on Research Implementation in Health Services (PARiHS) framework (Kitson et al., 2008)

2.3.2.3 Knowledge-To-Action Framework. Graham's Knowledge-To-Action (KTA) Framework (Graham et al., 2006) is one of the most recognisable models in the Knowledge Translation literature, and the third most widely used (Milat et al., 2017). The KTA framework was developed following a systematic review of over 60 planned action theories, and consists of two interactive components (see Figure 2-2) (Graham et al., 2006). The 'Knowledge Creation' component includes knowledge enquiry, knowledge synthesis, and the development of knowledge

tools or products, with an overall 'funnel' design that promotes knowledge tailoring (Straus et al., 2009b). The 'Action Cycle' describes eight processes, including: (a) identifying a problem, or evidence-practice gap, (b) identifying, reviewing, and selecting knowledge relevant to the problem, (c) adapting knowledge to the local clinical context, (d) assessing barriers and facilitators to knowledge use, (e) selecting, tailoring, and implementing interventions to promote use of the knowledge, (f) monitoring knowledge use, (g) evaluating outcomes, and (h) sustaining knowledge use (Graham et al., 2006). The action cycle is influenced by knowledge creation, and several action phases can take place simultaneously (Gagnon et al., 2011).

The KTA framework is widely recognised and has been adopted by the Canadian Institutes of Health Research as the accepted model for KT activities (Straus et al., 2008). It has been shown to be useful in a range of healthcare areas, including rehabilitation (Sinden & Macdermid, 2013), nursing (Campbell, 2010), occupational therapy (Petzold, Korner-Bitensky, & Menon, 2010), and speech pathology (Molfenter, Ammoury, Yeates & Steele, 2009).

The KTA framework has several advantages over other models. While, like the other frameworks discussed, it has not been empirically tested, it is one of the few models to have been used for both planning and evaluating knowledge translation strategies (Ward et al., 2009). Furthermore, as it highlights the role of the end users in the KT process, it is useful in ensuring that the translated knowledge is both relevant and applicable (Allaire et al., 2011; Campbell, 2010). The KTA framework includes all of the components identified in Ward and colleague's (2009) thematic analysis, and therefore represents a comprehensive picture of the KT process. In addition, it does not represent a tunnelled process; the process of KT is represented as dynamic, and can be started at any point. Another strength of this framework is that allows other theories and approaches to be embedded within each component, such as the Theoretical Domains Framework, described in Section 2.4.4.

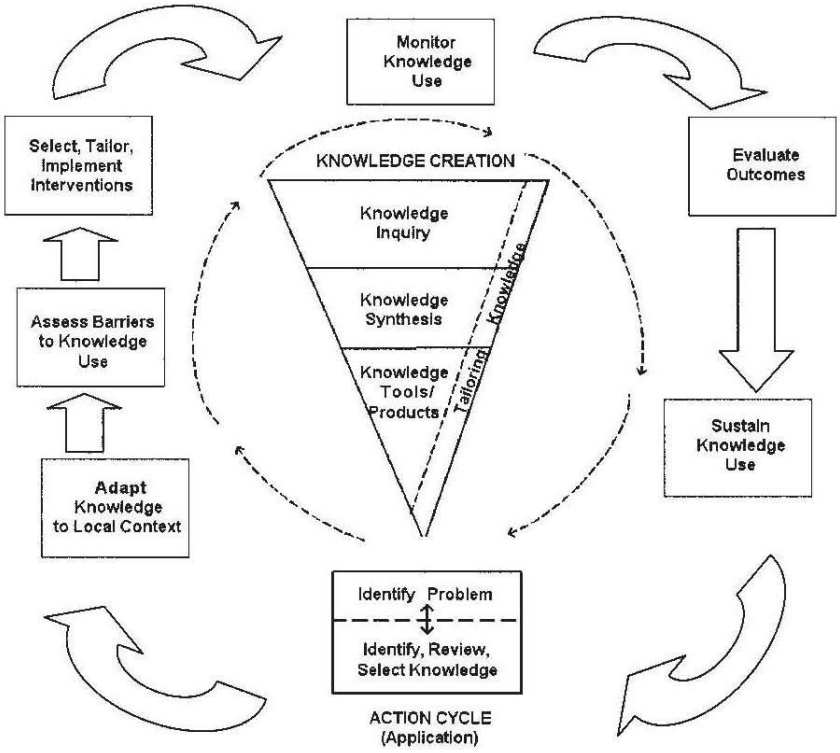

Figure 2-2. Knowledge to Action (KTA) Framework (Graham et al, 2006).

2.3.3 *Selecting a Knowledge Translation Model*

While there are numerous models and frameworks that can be used to describe the process of KT, there is limited research to indicate which is the best to use. No studies have been found that compare the effectiveness of different KT models. As such, it is unclear which are the most effective in guiding implementation.

Several limitations have been highlighted with the use of KT models and frameworks. A critical weakness is that many of the models are unrefined and have not been empirically tested, meaning that their suitability for designing and evaluating interventions is unknown (Straus et al., 2009b; Ward et al., 2009). Additionally, the majority of studies have applied the models retrospectively, rather than using them prospectively to guide implementation and plan interventions. Hence, there is a need for consensus guidelines for reporting the use and usefulness of theoretical frameworks within KT studies (Helfrich et al., 2010). While some have argued that implementation models are ill-equipped to explain the complex interrelationships between various elements of the KT process, as they are often represented in a discrete and linear manner (Eccles, Grimshaw, Walker, Johnston, & Pitts, 2005), the more recent models are more dynamic in their representation of KT. Another limitation of these models is that there is usually no theory embedded within them to explain how behaviour change actually occurs (Kontos et al., 2012), although this is

not always the case, as in the Knowledge To Action framework (Graham et al, 2006). The importance of the use of theory will be discussed in more detail in the next section of this review.

There is currently no accepted method to support the use of one KT model over another. The majority of models have not been tested, and do not clearly explain *how* they achieve change. Thus, it is important that researchers and clinicians who intend to use a KT model are aware of these limitations when selecting a model or framework, and consider whether and how theory can be applied.

2.4 Theories of Behaviour Change

Within the field of Knowledge Translation, behaviour change 'theories' are used to explain and describe the mechanisms by which behaviour change occurs, usually in response to implementation efforts (Milat, 2017; Nilsen, 2015). Many theories have been applied to implementation, or behaviour change, 'interventions', which aim to improve practice by changing behaviours. As behaviour change interventions can be targeted at individuals, social groups, organisations, there are different types of behaviour change theories that best suit each approach. Behaviour change theories can be further divided into 'classic' and 'implementation' theories, which may then be incorporated into different models and frameworks, including 'determinant frameworks' (Nilsen, 2015). While 'classic' theories originate from areas outside of implementation research, 'implementation' theories have been developed by implementation scientists for the purposes of understanding implementation. Determinant frameworks, such as the PARiHS model, aim to further explore the effects of implementation efforts on outcomes, and may or may not incorporate theory (Nilsen, 2015).

The purpose of the ensuing overview is to highlight the importance of using theory to understand behaviour change, and draw attention to how the use of traditional 'classic' theories has, to date, been inadequate in explaining all the variances in health professionals' behaviour. A further aim is to demonstrate that theory-based determinant frameworks may be more appropriate in explaining how behaviour change occurs as a result of implementation interventions. Hence, this section of the review will identify and briefly describe several 'classic' theories used in implementation, along with arguments for and against the use of theory. Finally, the Theoretical Domains Framework, a determinant framework that encompasses several theories, and the Behaviour Change Wheel, a determinant framework based on an 'implementation' theory, will be reviewed and critiqued, in order to determine their suitability to apply to a program of implementation research.

2.4.1 *The Importance of Theory in Implementation*

There has been debate regarding the necessity of using theory-informed behaviour change interventions. Proponents of the use of theory argue that knowledge translation theory is needed to develop testable interventions, to determine explicit causal pathways of the determinants of behaviour change, and to provide a 'map' for other researchers to follow (Eccles et al., 2005; Estabrooks et al., 2006; Michie et al., 2005). It is suggested that theory is important to identify the mechanisms of behaviour change, and to use these underlying mechanisms to prospectively guide the development of behaviour change interventions (Eccles et al., 2007). Conversely, critics have argued that until the value of KT theory has been empirically proven, it is not essential to use theory to guide the development of interventions, and a 'common sense approach' is sufficient (Bhattacharyya, Reeves, Garfinkel, & Zwarenstein, 2006; Fretheim, Flottorp, & Oxman, 2005). A related concept of 'mindlines' has also been described, whereby tacit guidelines are internalised and collectively reinforced based on interactions with literature, clients and colleagues (Gabbay & Le May, 2004). This phenomenon has received little empirical attention in the literature and is not well understood (Weiringa & Greenhalgh, 2015).

The debate about the importance of theory has abated in recent years, with researchers appearing to generally accept the need for theory-informed interventions. Nonetheless, ongoing efforts to refine the application of implementation theories to behaviour change are required.

2.4.2 *'Classic' Behaviour Change Theories*

Behaviour change interventions draw on many theories originating from external fields. Theories targeted at explaining and predicting an individual's behaviour include prominent psychological theories such as the Theory of Planned Behaviour and the Theory of Diffusion of Innovation. Theories that aim to explain behaviour change at a broader level (such as an organisational or societal level) include educational, organisational and marketing theories. This section provides a brief description of each of these, while acknowledging that more detailed summaries and critiques can be found elsewhere (see for example Estabrooks et al. (2006); and Graham and Straus (2009)).

2.4.2.1 Psychological Theories. Several cognitive psychological theories of change have been applied to KT. In these theories, individual thoughts or cognitions are seen to occur between observable stimuli and responses in real-life situations, and the health professional's behaviour is considered to be within the individual's control (Godin, Belanger-Gravel, Eccles, & Grimshaw, 2008; Graham & Straus, 2009). The two psychological theories most frequently applied to KT are the Theory of Planned Behaviour and the Theory of Diffusion of Innovations.

Theory of Planned Behaviour.

The Theory of Planned Behaviour (TPB) is based on the concept that a person's intention to perform a behaviour is a critical determinant of the person actually performing that behaviour (Ajzen, 1991; Fishbein & Ajzen, 2005; Perkins et al., 2007). The intention to perform a behaviour, in turn, depends on three variables: the person's *attitude* towards the behaviour (the extent to which the behaviour will result in consequences that the person values); the *subjective norm* (the belief that other people with influential opinions think the person should engage in the behaviour), and their *perceived behavioural control* over that behaviour (Ajzen, 1991).

The TPB has been extensively applied in the field of KT, and it has been shown to be an appropriate theory to predict intention and behaviour. Specifically, Eccles and colleagues' (2006) systematic review of ten studies (n = 1623) showed a predictable relationship between the intentions of a health professional and their subsequent behaviour, by comparing self-reported behavioural intentions to observed clinical behaviour. The TPB has also been useful in demonstrating that different theoretical constructs predict intentions and behaviour differently depending upon the type of clinician and the guideline recommendation itself. For example, in a study of physicians, *attitudes* were the strongest predictor of intentions for antibiotics guideline utilisation, but *subjective norms* were the strongest predictor of junior physicians' use of an asthma management guideline (Limbert & Lamb, 2002).

Whilst there is strong evidence that the TPB can successfully explain clinicians' behaviour, it provides little guidance on how to *change* behavioural determinants. It has been suggested that behaviour change can be brought about by interventions that change the intentions to perform a behaviour (Ajzen, 1991). However, despite these suggestions, the TPB does not explicitly describe how to bring about these changes, and has been criticised for focusing only on voluntary human behaviour, when so much of health practice and behaviour has at least some automatic, rather than explicitly intentional, component – such as a clinician remembering to perform hand hygiene after every patient contact (Brehaut & Eva, 2012).

Theory of Diffusion of Innovation.

The Diffusion of Innovation (DOI) Theory, developed in the early 1950s, is one of the most prevalent theories found in the KT literature. This theory seeks to explain how, over time, an idea, product, or *innovation,* is diffused and adopted. *Diffusion* is described as the process by which an innovation is communicated through certain channels among the members of a social system (Rogers, 2003). The DOI theory proposed that there are five attributes of an innovation that effect

adoption: (1) *relative advantage*, (2) *compatibility*, (3) *complexity*, (4) *trialability*, and (5), *observability* (Rogers, 2003). Specifically, the theory suggests that innovations will be more easily adopted and implemented if they offer a clear advantage over a different approach, fit with current values, are simple to implement, can be trialed, and show visible results (Scott, Plotnikoff, Karunamuni, Bize, & Rodgers, 2008).

Evidence suggests that the DOI theory is useful in explaining why the adoption of an innovation is, or isn't, successful. For example, a systematic review found that if a potential user perceives no relative advantage in using an innovation, it is less likely to be adopted (Greenhalgh, Robert, MacFarlane, Bate, & Kyriakidou, 2004). Despite its longevity and usefulness in *explaining* behaviours, the DOI theory was not designed to cause or guide behaviour change (Graham & Straus, 2009), and is therefore less useful when prospectively designing a behaviour-change intervention.

2.4.2.2 Educational and Social Learning Theories. There are several educational and social learning theories that can be applied to KT interventions. These theories are thought to be particularly helpful in designing and explaining the effectiveness of educational interventions (Graham & Straus, 2009). For example, Leib's (1991) adult learning theory assumes that adults have a range of life experience, are self-directed, and more likely to learn something that they perceive to be relevant (Merriam & Caffarella, 1999). Furthermore, individuals may align closely with one learning 'style', such as activist, reflective, theoretical or pragmatic styles, indicating that a range of educational techniques should be used to ensure maximum learning occurs (Collins, 2004; Lewis & Bolden, 1989). Although there is a limited evidence base for educational theories in the development of behaviour change interventions, there is strong evidence from systematic reviews that interactive education is more effective than passive didactic lectures (Forsetlund et al., 2012; Grol & Grimshaw, 2003), indicating their potenial importance.

2.4.2.3 Organisational Theory. Organisational theory is not directly targeted at the individual, but rather aims to improve the context for knowledge use at an organisational level, which will subsequently result in individual behaviour change. Organisational theory aims to improve organisational knowledge use by targeting three core concepts. These concepts are *knowledge as capabilities*, referring to organisational structure and available resources, *knowledge as process*, referring to the process of contextualising and adapting knowledge locally, and *knowledge as codification*, referring to embedding knowledge in established information systems (Graham & Straus, 2009). Some examples of organisational approaches to change are increased performance pressure through benchmarking, and open access policies to library databases

(Grimshaw et al., 2004). Although there are several organisational interventions that can be applied in the KT process, the underlying organisational theory is less understood and has not been focused on to the same extent as individual behaviour change theories.

2.4.2.4 Social Marketing Theories and Academic Detailing. Social marketing theory proposes that, by targeting an individual's knowledge and attitudes, public health programs can raise community awareness, enhance understanding, and address commonly held misperceptions (Evers, Jones, Iverson, & Caputi, 2013). It has been suggested that educational outreach visits, a common type of behaviour change intervention, are derived from social marketing theory (Soumerai & Avorn, 1990). Furthermore, research has shown that the social marketing framework is effective increasing knowledge of particular health issues and changing targeted health behaviours (Stead, Gordon, Angus, & McDermott, 2006). As with organisational theory, however, the social marketing theory itself has not been extensively studied in the healthcare context, therefore it is unclear precisely how behaviour change occurs.

2.4.3 *Which is the Best Theory?*

There is no single overarching behaviour change theory used in knowledge translation or implementation research. Some attempts have been made to determine the value of theories by comparing them, however these have been inconclusive.

With regards to psychological theories, a systematic review of 78 studies showed that, when compared with other theories, studies based on the Theory of Planned Behaviour best predicted health professionals' behaviour (Godin et al., 2008). Despite these findings, psychological theories do not sufficiently explain and predict all of the variance in health professionals' behaviour. As different theories may be more relevant to interventions at different levels, multilevel approaches that address cognitive, educational, marketing, and organisational theories may all deliver valuable perspectives to changing clinicians' behaviour (Perkins et al., 2007). For example, theories of individual behaviour are more relevant to interventions directed at individuals and teams (such as an individual clinician using a new evidence-based treatment that they themselves will deliver), whereas organisational theories may be more relevant to interventions directed at hospitals (such as a large service redesign involving multiple stakeholders) (Eccles et al., 2005).

Despite the extensive array of theories that could be applied to behaviour change studies, these have not been consistently applied to health professional behaviours, and, as such, the contribution of differing theories is not clear (Eccles et al., 2007). A systematic review of 235 studies found that while 22.5% reported using theories, less than 6% of studies explicitly used

theory, and reporting of the rationale for using specific theories was poor (Davies, Walker, & Grimshaw, 2010). Furthermore, only a small number of theories accounted for the majority of theory use (Davies et al., 2010).

Given that there is no single theory available that can explain or predict all the variances in health professionals' behaviour, there is strong support for a multilevel approach involving a combination of theories. Two multilevel approaches, the Theoretical Domains Framework and the Behaviour Change Wheel, are discussed below.

2.4.4 *The Theoretical Domains Framework*

The Theoretical Domains Framework (TDF) was developed by Michie and colleagues (2005) in an attempt to simplify and combine the plethora of behaviour change theories. Noting the number of potentially relevant and substantially overlapping health and psychological theories, this group engaged in a consensus process that synthesised 33 theories and 128 key theoretical constructs related to behaviour change into 12 'domains' relevant to implementation research (Abraham & Michie, 2008; Brehaut & Eva, 2012; Michie et al., 2005).

Since its development, the TDF has been validated and further refined (Cane, O'Connor, & Michie, 2012), with the most recent update containing 14 theoretical domains. Some of these domains operate at the level of the individual (e.g., knowledge, skills, and emotions), some at an organisational level (e.g., environmental context and resources, and reinforcement), and some operate at a social level (e.g., social influences, and social/professional role and identity). Each domain has a corresponding definition, based on the American Psychological Associations' Dictionary of Psychology (2007), and includes multiple constructs, whereby a theoretical construct is defined as a component part of a theory (Michie et al., 2005). For example, the domain '*knowledge'*, defined as 'an awareness of the existence of something', includes the constructs *knowledge*, *procedural knowledge*, and *knowledge of task environment*.

Table 2-2. TDF Domains, Definitions and Constructs (Cane et al., 2012)

Domain	Definition	Constructs
1. Knowledge	An awareness of the existence of something.	Knowledge (including knowledge of condition /scientific rationale) Procedural knowledge Knowledge of task environment
2. Skills	An ability or proficiency acquired through practice.	Skills Skills development Competence Ability Interpersonal skills

		Practice Skill assessment
3. Social/ Professional Role and Identity	A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting.	Professional identity Professional role Social identity Identity Professional boundaries Professional confidence Group identity Leadership Organisational commitment
4. Beliefs about Capabilities	Acceptance of the truth, reality, or validity about an ability, talent, or facility that a person can put to constructive use.	Self-confidence Perceived competence Self-efficacy Perceived behavioural control Beliefs Self-esteem Empowerment Professional confidence
5. Optimism	The confidence that things will happen for the best or that desired goals will be attained.	Optimism Pessimism Unrealistic optimism Identity
6. Beliefs about Consequences	Acceptance of the truth, reality, or validity about outcomes of a behaviour in a given situation.	Beliefs Outcome expectancies Characteristics of outcome expectancies Anticipated regret Consequents
7. Reinforcement	Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus.	Rewards (proximal / distal, valued / not valued, probable / improbable) Incentives Punishment Consequents Reinforcement Contingencies Sanctions
8. Intentions	A conscious decision to perform a behaviour or a resolve to act in a certain way.	Stability of intentions Stages of change model Transtheoretical model and stages of change

9. Goals	Mental representations of outcomes or end states that an individual wants to achieve.	Goals (distal / proximal) Goal priority Goal / target setting Goals (autonomous / controlled) Action planning Implementation intention
10. Memory, Attention and Decision Processes	The ability to retain information, focus selectively on aspects of the environment and choose between two or more alternatives.	Memory Attention Attention control Decision making Cognitive overload / tiredness
11. Environmental Context and Resources	Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behaviour.	Environmental stressors Resources / material resources Organisational culture /climate Salient events / critical incidents Person x environment interaction Barriers and facilitators
12. Social Influences	Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviours.	Social pressure Social norms Group conformity Social comparisons Group norms Social support Power Intergroup conflict Alienation Group identity Modelling
13. Emotions	A complex reaction pattern, involving experiential, behavioural, and physiological elements, by which the individual attempts to deal with a personally significant matter or event.	Fear Anxiety Affect Stress Depression Positive / negative affect

		Burn-out
14. Behavioural Regulation	Anything aimed at managing or changing objectively observed or measured actions.	Self-monitoring Breaking habit Action planning

The TDF was designed to have two main purposes. The first purpose was to give a definitive set of theoretical explanations of behaviour change (Graham & Straus, 2009; Michie et al., 2005). Secondly, the TDF was designed to be used as a tool to identify the barriers and facilitators to evidence uptake in a particular context. By identifying these relevant barriers and facilitators, the 'domains' can be linked to implementation techniques, so that appropriate behaviour change interventions can be systematically selected (Cane et al., 2012). The TDF is an example of Nilsen's (2015) 'Determinant frameworks' that identifies determinants (domains) that influence implementation outcomes. Additionally, the TDF is also regarded as an 'Evaluation Framework' (Nilsen, 2015), as it can be used to evaluate the factors in implementation outcomes.

Although the TDF is a relatively new way of conceptualising the numerous behaviour change theories available, it has proven useful in helping to both understand the barriers to behaviour change and in designing successful behaviour change interventions (Duncan et al., 2012; Dyson, Lawton, Jackson, & Cheater, 2010; Phillips et al., 2015). In addition, there are positive clinical implications to its use, with clinicians who have used the TDF in implementation projects reporting increased confidence in undertaking an implementation project (Phillips et al., 2015). However, the TDF has been criticised for replacing established theories with the theoretical construct domains, which do not specify the relationships between the theoretical domains as would occur in a theory (Francis et al., 2009). In addition, users of the framework have reported challenges to its operationalisation, including understanding the domains, and explaining how the outcomes of the study were influenced by the framework (Phillips et al., 2015). Despite these limitations, the TDF has become a dominant framework for determining the barriers and facilitators to implementation, with over 200 papers published using the TDF since it was introduced in 2012. This swift uptake of the framework may assist in the development of a shared understanding of behaviour change, and allow for comparison between studies. Thus, there is compelling support for the use of the TDF as an overarching framework in the development of a theory-informed behaviour change intervention. Further description of the TDF as a tool to identify barriers and facilitators can be found in Section 2.5.3.

2.4.5 *The Behaviour Change Wheel*

The Behaviour Change Wheel (BCW) is a framework created to improve the process of designing successful behaviour change interventions (Michie, van Stralen, & West, 2011). It was developed to overcome some of the limitations of other frameworks, which did not encompass the full range of intervention functions and policy categories identified as potentially useful in designing behaviour change interventions (Michie, Atkins, & West, 2014; Michie et al., 2011).

In their book, the authors describe the BCW as a synthesis of 19 behaviour change frameworks that draws on a wide range of disciplines and approaches (Michie et al., 2014). At the centre of the BCW is the Capability, Opportunity, Motivation and Behaviour (COM-B) hub, representing this synthesis of theories. The COM-B was developed on the basis of a US consensus meeting of behavioural theorists and a principle of US criminal law, and proposes that motivation, capability and opportunity are all necessary conditions for a volitional behaviour to occur (Nilsen, 2015). The three components influence behaviour, which in turn can alter capability, motivation and opportunity (Michie et al., 2014).

The BCW has several strengths. The first relates to the way that is was developed, with the COM-B developed using a combination of psychological theory and expert opinion, with evidence of validity and reliability (Michie et al, 2011; Michie et al, 2014). Another strength of the BCW is that it can be used in parallel with the TDF, as each TDF domain relates to a COM-B component, shown in Figure 2-3. This is a positive aspect of the model, as the BCW itself does not identify theoretical determinants of potential factors that may influence practice (Michie et al, 2011), and therefore may not fully explain the mechanisms of behaviour change.

Although the BCW appears to be useful in designing behaviour change interventions (Handley et al., 2016; Mc Sharry, Murphy, & Byrne, 2016), the underlying theory forming the basis of the COM-B is still being empirically tested. Nevertheless, since the BCW was first published in 2011, over 50 research papers have been published that utilise the framework. However, of these, only one study was a completed randomised controlled trial (RCT), with an additional six RCTs being study protocols. The remainder of the literature that uses the BCW is primarily qualitative, indicating that there is still further research needed to support the BCW's use.

Despite this lack of high-level research design, the BCW has become a dominant framework in designing behaviour change interventions. It has been used in many healthcare areas, including audiology (Barker, Atkins & de Lusignan, 2016), physical therapy (Connell, McMahon, Tyson, Watkins & Eng, 2016), and public health (Webser & Bailey, 2013). In this way, like the TDF, using

the BCW may assist in promoting a shared understanding of behaviour change interventions, and allow for comparison between studies. Thus, the BCW may be a useful and reliable way to develop a behaviour change intervention, provided that users are aware of its limitations. Further description of the BCW as a tool to design a behaviour change intervention can be found in Section 2.7.1 of this chapter.

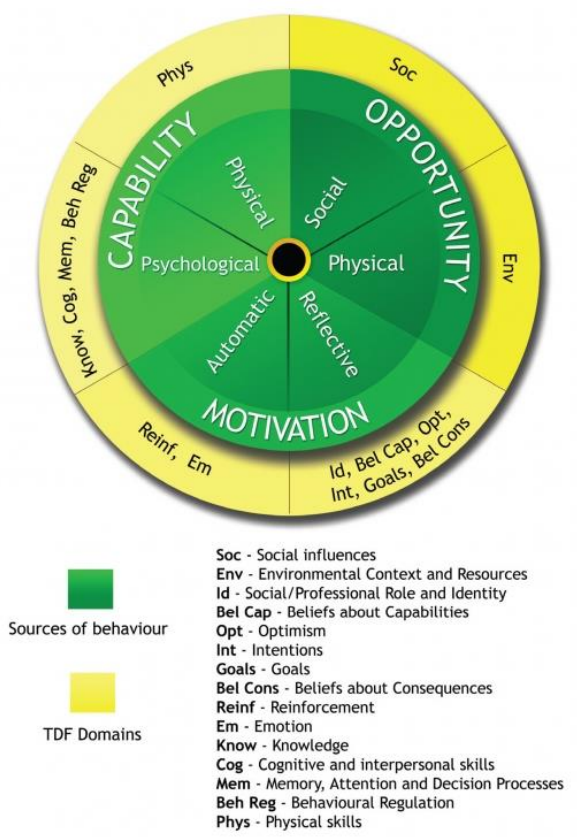

Figure 2-3. TDF Domains Linked to COM-B Components (Michie et al., 2014, reproduced with permission)

2.5 Barriers and Facilitators to Evidence Uptake

"By not entertaining the full spectrum of barriers, important interventions to improve physician behavior might not be investigated or implemented." (Cabana et al, 1999)

The assessment of barriers and facilitators to the uptake of evidence is a fundamental component of the process of implementation, and has been widely studied. Two systematic reviews have shown that interventions directly targeting identified barriers and enablers are more effective in changing behaviours than non-tailored interventions (Baker et al., 2015; Baker et al., 2010). However, barriers and facilitators can vary between different professional groups, different organisations and different healthcare settings, and therefore can frequently not be generalised. In order to determine which influencing factors may be important in this program of research, the

following section examines some of these differences and reviews methods of examine barriers and facilitators to evidence uptake.

2.5.1 *Types of Barriers and Facilitators*

There are many reasons that research evidence may not implemented into practice. Simply having strong evidence is insufficient in changing health professionals' behaviours (Mickan, Burls, & Glasziou, 2011). The barriers and facilitators to evidence uptake are frequently categorised into various levels, including the innovation itself, the individual professional, the patient, the social context, the organisational context, and the economic and political context (Grol & Wensing, 2004). The National Institute of Clinical Studies (2006) summarised the most common barriers and facilitators based on findings by Grol and Wensing (2004) and Rainbird and colleagues (2006), which are presented in Table 2-2.

Much of the early barriers research focused at the level of the individual (for example, Cabana et al., 1999), but more recent research has indicated that characteristics of guidelines (the innovation) and organisational factors may exceed the influence of personality traits in affecting professionals' willingness to adopt guidelines (Farquhar, 2002; Goossens, Bossuyt, & de Haan, 2008). A systematic review of 30 studies focusing on physicians found that there is consistently high satisfaction reported with clinical practice guidelines, leading the authors to conclude that negative clinician attitudes are not the major barrier to implementation (Farquhar, 2002). Some common barriers acting at the level of the innovation, the individual professional, the patient, and the organisation, are described below.

Table 2-3. Types of Barriers and Enablers that may Impede Best Practice at Different Levels of Health Care (National Institute of Clinical Studies, 2006)

Level	Type of Barrier or Enabler	Examples
The innovation itself	Advantages in practice Feasibility Credibility Accessibility Attractiveness	Clinical practice guidelines may be perceived as inconvenient or difficult to use. Guidelines recommending the elimination of an established clinical practice, such as screening for lung cancer with chest x-rays, may be more difficult to follow than guidelines that recommend adding a new behaviour.
Individual professional	Awareness Knowledge	Clinicians may not agree with a specific guideline or the concept of guidelines in general. Clinicians may not have the

	Attitude Motivation to change Behavioural routines	motivation to change or may not feel competent to provide specific services, such as counselling about exercise or diet.
Patient	Knowledge Skills Attitude Compliance	Patients may expect certain services, such as the prescription of antibiotics for upper respiratory infections.
Social context	Opinion of colleagues Culture of the network Collaboration Leadership	Local opinion leaders may encourage the use of forms of care that have not been shown to be effective, such as screening for ovarian or prostate cancer.
Organisational context	Care processes Staff Capacities Resources Structures	Burdensome paperwork or poor communication may inhibit provision of effective care.
Economic and political context	Financial arrangements Regulations Policies	Reimbursement systems may promote unnecessary services or discourage best practice.

2.5.1.1 Barriers at the Level of the Innovation. There are several factors related to the innovation itself that influence whether or not research findings or recommendations are adhered to. A number of studies have focused on physicians' perceptions of clinical guidelines, showing that many perceive certain guideline characteristics be barriers to their use, including being too prescriptive (Farquhar, 2002), not taking into account the specific context, and having frequently unclear or ambiguous recommendations (Lugtenberg, Zegers-van Schaick, Westert, & Burgers, 2009). Furthermore, guideline recommendations are more likely to be adopted if they are specific, easy to read and underpinned by research evidence (Grol et al., 1998). Goossens and colleagues reported similar findings (2008), whereby ''scientific basis'' was the strongest determinant for physicians in adopting a recommendation.

2.5.1.2 Barriers at the Level of the Individual. At the individual level, the awareness-to-adherence model (Pathman, Konrad, Freed, Freeman, & Koch, 1996) was one of the earliest models developed to explain why clinicians may or may not follow recommended practice. This model describes four sequential steps that need to be made in order to comply with a guideline. Firstly, the clinician must become aware of a guideline, then agree with it, then decide to adopt it in their practice, and finally adhere to it appropriately. According to the model, lack of guideline

adherence may be due to a breakdown at any of the four stages. For example, even when a health professional is aware of a guideline, he or she may not agree with it. A more recent systematic review found that 'leakage' from research to guideline utilisation occurs at all steps of the awareness-to-adherence pathway, with only a third of guidelines being routinely adhered to (Mickan et al., 2011).

Another common research finding is that clinicians are more likely to adhere to a guideline if it aligns with their previous clinical experience. For example, a landmark systematic review of 76 studies investigating barriers to physician guideline adherence found that, in addition to lack of awareness and lack of agreement, the third most common barrier was inertia of previous practice (Cabana et al., 1999). Some of these findings were recently replicated in a survey of general practitioners, with lack of agreement with the recommendations (68%), and lack of knowledge regarding the guideline recommendations (46%), reported as two of the most commonly perceived barriers (Lugtenberg et al., 2009). One notable difference, however, was that the inertia of previous practice (27%) was a less common barrier than in the review by Cabana and colleagues (1999), which may indicate an overall change in attitudes towards guideline adherence, with less reliance on previous experience.

2.5.1.3 Barriers at the Level of the Organisation. As healthcare professionals work in specific organisational and structural settings, there are factors that may support or impede change at the level of the organisation, including care processes, policies and resource allocation (Farquhar, 2002; Grol & Wensing, 2004). The most commonly mentioned barrier at an organisational level is time (Gravel, Legare, & Graham, 2006; Metcalfe et al., 2001; Mills, Field, & Cant, 2011). This relates to time to read research and time to apply research findings into practice. Organisational factors may be equally important in influencing guideline adherence as individual factors. Moreover, some studies have found that implementation interventions targeting the organisation can be more successful that those that target individuals (for example, Dobbins et al., 2009).

2.5.1.4 Barriers at the Level of the Patient. Patient-related factors may also influence whether recommended healthcare is received. Not only must a patient agree with the recommended treatment, he or she must be able to undertake it and comply with it (Glasziou & Haynes, 2005; Grol & Wensing, 2004). Patient decision aids have been developed to assist communication and understanding between healthcare providers and patients, however it is unclear whether they result in better compliance with recommendations (Stacey et al., 2011). Although the

barriers to patient adherence to recommended treatments have been studied less than those for clinicians, they are nevertheless an important consideration in implementation research.

2.5.2 *Differences between Professional Groups and Organisational Settings*

Although there is some overlap, barriers and facilitators to evidence uptake differ between professional groups such as physicians, nursing staff, and allied health professionals, and organisational settings.

Barriers studies with nurses and physicians show some differences between the influence of organisational barriers and guideline awareness. A survey of 575 nurses in the US showed that the majority (67%) of barriers and facilitators to the use of CPGs were organisational (including time), with the surveyed nurses not reporting a lack of awareness of a guideline's existence as a primary barrier to use (Abrahamson, Fox, & Doebbeling, 2012). This contrasts with the often-cited lack of awareness reported by 54.5% of physicians, while organisational constraints (36%) were perceived to be a barrier less often (Cabana et al., 1999; Lugtenberg et al., 2009). Furthermore, nursing staff are more likely to make changes to practice based on whether they find the subject of a guideline interesting, whereas physicians are more likely to change practice based on the strength of the evidence, or "scientific basis" (Goossens et al., 2008).

There are also similarities and differences between the barriers reported by physicians, nurses and allied health professionals. In a study of 572 allied health professionals, comprising physiotherapists, occupational therapists, dieticians and speech pathologists, the majority reported problems with the literature including understanding statistics (78%), the literature not being compiled in one place (78%) and implications for practice not being made clear (66%) (Metcalfe et al., 2001). These findings were similar to those from the nursing literature, whereby an inability to understand statistical analyses was one of the most common barriers (Hutchinson, 2006; Kajermo et al., 2010); however this was *not* a common barrier reported by physicians (Cabana et al., 1999; Lugtenberg et al., 2009). In another similarity to barriers perceived by nurses, allied health professionals reported several barriers at an organisational level, with the main organisational barriers including insufficient time (66%), inadequate facilities (57%), being isolated from colleagues (37%) and doctors not co-operating with change (36%) (Metcalfe et al., 2001). In contrast to nurses (Hutchinson, 2006; Kajermo et al., 2010) however, allied health professionals were not as concerned regarding a lack of authority to implement research findings in practice. One possible explanation for these differences may be that different professional groups have different learning styles (Goossens et al., 2008). Alternatively, it is possible that different professionals utilise research differently, with physicians being more comfortable with understanding the

research, as reserach originated from the medical profession, and is less entrenched in nursing and allied health (Dizon, Grimmer-Somers, & Kumar, 2012).

In addition to differences between barriers experienced by allied health and other healthcare professionals, there are also differences between different *groups* of allied health professionals. For example, one survey showed that registered dietitians read more research articles than other health care disciplines, with 67% of respondents reading an article within the past week (Byham-Gray, Gilbride, Dixon, & Stage, 2005). This high level of 'keeping up to date' with the literature also exceeds both nurses and physicians, with the latter group reportedly reading less than three original research articles per month (Beasley & Woolley, 2002). In another difference, speech pathologists perceived more barriers to implementation than occupational therapists and physiotherapists (Metcalfe et al., 2001).

While few studies have directly compared barriers across workplace and organisational settings, some differences have been highlighted in the literature. For example, physiotherapists working in small, community-based, rural, or non– teaching institutions reported more barriers to research utilisation than those working in urban areas with large staff numbers (Salbach, Jaglal, Korner-Bitensky, Rappolt, & Davis, 2007). Similarly, in a survey of speech pathologists, there was a significant association between the acute care setting and therapists not feeling capable of evaluating the quality of the research, while no association was found between this perceived barrier and community care or voluntary agencies (O'Connor & Pettigrew, 2009).

Few studies have looked at the barriers to evidence uptake in the rehabilitation setting. One recent study conducted focus groups with 79 rehabilitation professionals including nurses, physiotherapists, occupational therapists and managers, and found variation in perceptions of barriers across stakeholders (Bayley et al., 2012). For example, nurses reported more training and staffing barriers than other groups, whereas managers perceived fewer barriers overall than frontline clinicians. Some of the barriers, such as lack of time, have been frequently reported in the health care literature, however others, such as lack of role clarity between physiotherapy, occupational therapy and nursing, appear to be particularly relevant to rehabilitation where more interdisciplinary collaboration is required (Bayley et al., 2012).

Most of the studies presented above used a survey design, and were therefore based on self-report, which may be subject to bias (Adams, Soumerai, Lomas, & Ross-Degnan, 1999). In addition, the majority of studies developed their own survey tool that was not tested for reliability or validity. Nonetheless, there were large sample sizes in several of the studies (e.g. Metcalfe et al.,

2001, Abrahamson et al., 2012), and the analysis of the findings appeared to be consistent with theory. While the above findings represent only a sample of the literature available on barriers and facilitators, it can be seen that findings from one professional group in one setting may not be generalisable to another setting or profession. As such, it is necessary to thoroughly assess the barriers and facilitators to evidence uptake in each setting with the target population for practice change.

2.5.3 *Assessment of Barriers and Facilitators*

A thorough assessment of the barriers and facilitators to research use is important, so that behaviour-change interventions can be tailored to specific needs. Several techniques may be used to examine barriers and enablers to research use, for example, individual interviews, focus groups, self-administered questionnaires and direct observation (Gravel et al., 2006; National Institute of Clinical Studies, 2006). There is currently no gold standard for the assessment of barriers and facilitators. However, the Theoretical Domains Framework (TDF) has been used in a number of different barriers studies (Phillips et al, 2015), thus can be used to compare results with other research. In addition, the TDF can be mapped to the COM-B and the Behaviour Change Wheel (see 2.4.5), adding to its usefulness in determining barriers.

2.5.3.1 Using the Theoretical Domains Framework to Assess Barriers. The Theoretical Domains Framework (TDF), introduced previously, provides a framework for the assessment of barriers and facilitators based on a number of different theories. Following its development by Michie and colleagues in 2005, the TDF was validated and refined to include 14 domains (Cane et al., 2012), as described previously in this chapter.

The TDF has primarily been used to identify barriers and facilitators by providing a framework to conduct semi-structured interviews. For example, an Australian study used the TDF to identify the barriers and enablers to the implementation of evidence-based guidelines for acute low back pain (McKenzie et al., 2008; McKenzie et al., 2010), and subsequently develop a theory-informed behaviour change intervention (French et al., 2012). In the UK, the TDF has been used to investigate prescribing errors among trainee doctors (Duncan et al., 2012). In this study, seven domains met the criteria for perceived "relevance" and were therefore deemed to be potential targets in interventions to improve prescribing behaviours. Both of these used semi-structure interview techniques, however the former study used the TDF retrospectively during data analysis to code the themes, whereas the latter used the framework prospectively when developing the topic guide for the interviews.

The TDF has also been used as a framework to develop questionnaires investigating barriers and facilitators to evidence uptake. These include the development of a hand hygiene questionnaire (Dyson, Lawton, Jackson, & Cheater, 2013), and a survey investigating midwives' perceptions of difficulties in implementing guidelines related to smoking cessation in pregnant women (Beenstock et al., 2012). The former study found good levels of validity and reliability for their questionnaire, while the latter found a lack of distinction between the domains, potentially leading to high intercorrelations. This lack of distinction between domains has been further supported by Huijg and colleagues (2014), who found that the domains *Reinforcement*, *Goals*, and *Behavioural regulation* were judged to measure a combination of domains, using discriminant content validity. Thus, there is evidence that the TDF is useful in identifying barriers and facilitators using a questionnaire, but some care needs to be taken in the survey design. In addition, the TDF requires further testing of its effectiveness in tailoring implementation strategies.

Although the TDF has mainly been used as a basis for the *assessment* of barriers and facilitators, it has also been used to *design* interventions. While not the focus of this section, examples of this are an intervention designed to improve acute low back pain management in primary care (French et al., 2012), and an intervention to optimise caseload management in paediatric occupational therapy (Kolehmainen, 2009). The OT study showed changes in clinicians' behaviours of interest (Kolehmainen & Francis, 2012), while the intervention targeted at GPs did not result in statistically significant changes in actual behaviour (French et al, 2012). This shows that the TDF is potentially effective in designing interventions, but more research is needed to understand why some interventions did not result in significant change. These findings were recently echoed by Phillips and colleagues (2015), where TDF users reported challenges in linking the study outcomes to the influence of the framework.

There are several advantages to using the TDF. In particular, using the TDF to investigate barriers and facilitators has resulted in a greater extent of factors being identified than if only a single theoretical model had been used (Duncan et al., 2012; Dyson et al., 2010). Furthermore, as it is based on a clear framework, it allows researchers to identify and design interventions systematically, allowing for clear rationales of research methodology and potentially replicable results (Francis, O'Connor, & Curran, 2012; French et al., 2012; Phillips et al., 2015). Limitations to the TDF include the, at times, poor inter-rater reliability (Beenstock et al., 2012; Huijg et al., 2014), and the resource-intensive nature of conducting interviews (Phillips et al., 2015). However, the framework is increasingly being used to develop questionnaires, which will potentially result in less time and resources being required.

The TDF has been shown to be a valid and useful tool to assess the barriers and facilitators to evidence uptake in healthcare. One of strengths lies in its foundation in behaviour change theory, thus promoting the development of theory-informed tailored interventions that aim to improve healthcare outcomes. While there is still research needed on the effectiveness of these interventions, and whether interventions based on the TDF are more effective than those that have not used this framework, the use of the TDF is well-supported by the literature.

2.5.4 *Summary*

The assessment of barriers and facilitators is an important step in the process of implementation. The barriers and facilitators to a patient receiving recommended care are complex, and not yet fully understood. This well-studied area has shown differences between professional groups and organisational settings, indicating that findings from one population in one setting may not be generalisable to another. These differences highlights the need to thoroughly assess these factors for each profession in the specific context where an implementation intervention is planned. While there is no gold standard assessment tool, it is generally accepted that a validated and theory-based assessment framework, such as the TDF, should be used.

2.6 Interventions

There are a variety of interventions that can be implemented to change the behaviour of healthcare professionals. An international consensus process let to the development of the 'Behaviour Change Taxonomy', which includes 93 distinct behaviour change techniques (Michie et al., 2013). This section will discuss the most common types of interventions used, and evidence surrounding their effectiveness. There is debate about whether a single or multifaceted approach is more effective, and the methods used to select interventions have also been considered. In the past, interventions were frequently chosen intuitively, based neither on theory nor explicit attempts to tailor the interventions to identified barriers. The prevalence of non-theory informed interventions, in addition to poor reporting standards, may have led to inconsistent findings when attempting to improve practice through implementation interventions, which is discussed below.

2.6.1 *Commonly Used Behaviour Change Interventions*

Interventions that aim to change healthcare behaviour have been widely studied. Specifically, the Cochrane EPOC (Effective Practice and Organisation of Care) Group had identified over 7,000 randomised and quasi-experimental studies, and conducted 110 systematic reviews of professional, organisational, financial, and regulatory interventions by 2015 (Cochrane Collaboration, 2017; Grimshaw et al., 2012). Furthermore, over 300 systematic reviews of professional behaviour

change strategies have been identified (Grimshaw et al., 2012). The most commonly used behaviour change interventions are introduced below.

2.6.1.1 Interventions Targeting Individuals.

A. Printed Educational Materials

The Cochrane EPOC Group defines *printed educational materials* (PEMs) as the 'distribution of published or printed recommendations for clinical care, including clinical practice guidelines, audio-visual materials and electronic publications' (2002). In general, PEMs target knowledge and potential skill gaps of individual healthcare professionals.

Historically, the use of PEMs has been shown to have a limited effect, leading researchers to use them as a control condition for evaluating the effects of other behaviour change interventions. The original Cochrane review of 9 studies comparing PEMs to no intervention concluded that this strategy had little impact on professional practice (Freemantle et al., 1997), which was supported by a subsequent review concluding that passive dissemination was generally ineffective (National Health Services Centre for Reviews and Dissemination, 1999). However, the most recent update, which included 45 studies, led authors to conclude that while PEMs may have a small beneficial effect on professional practice outcomes, it is unknown whether this effect is clinically significant, and there is insufficient information to draw any conclusions about the effect on patient outcomes (Giguère et al., 2012). Therefore, it has been suggested that policy makers should not dismiss this strategy given its possible effect, low cost and feasibility in the health care system (Grimshaw et al., 2012).

B. Educational meetings and workshops

EPOC defines *educational meetings* as the 'participation of healthcare providers in conferences, lectures, workshops or traineeships' (2002). In the healthcare setting, educational strategies to target behaviour change are common and generally feasible in most settings, with the main cost related to the release time for healthcare professionals (Grimshaw et al., 2012).

An important factor in the effectiveness of educational meetings is the distinction between didactic meetings that largely target knowledge barriers, and interactive workshops, that can target knowledge, attitudes, and skills. For example, a systematic review showed that while large conferences and courses showed mixed effects on changing behaviour, small groups with active participation showed positive effects (Grol & Grimshaw, 2003). These findings have been reiterated in a recent Cochrane review of 81 trials, which suggested using mixed interactive and

didactic formats as a strategy to increase the effectiveness of educational meetings (Forsetlund et al., 2012). Other suggested strategies to improve the effectiveness of these interventions were to increase meeting attendance, and to focus on outcomes likely to be perceived as serious (Forsetlund et al., 2012).

In general, educational meetings have been shown to be effective in changing health professionals' behaviour. In a review of a wide range of guideline implementation strategies, Grimshaw and colleagues (2004) concluded that educational meetings resulted in small to modest improvements when compared to no intervention. Similarly, the Forsetlund and colleagues (2012) review found that while educational meetings can improve the practice of professionals and improve patient healthcare outcomes, the effect is most likely to be small, with a median improvement of 6%.

C. Educational Outreach

The Cochrane EPOC Group definition of *educational outreach* is the "use of a trained person who meets with providers in their practice settings to give information with the intent of changing the providers' practice" (2002). It has been suggested that educational outreach derives from social marketing approaches that target an individual's knowledge and attitudes (Soumerai & Avorn, 1990).

As with other interventions, studies examining the effects of educational outreach have shown generally small to modest effects. In a broad review of implementation strategies, there was a median improvement of 6% of multifaceted interventions involving educational outreach (Grimshaw et al., 2006). These findings were echoed in an updated Cochrane review of 69 studies, which showed a median improvement of 4.8% for prescribing, and 6% for other behaviours (O'Brien et al., 2008).

D. Local Opinion Leaders

The EPOC group defines *local opinion leaders* as the 'use of providers nominated by their colleagues as 'educationally influential'' (2002). This intervention has been used less frequently than other intervention types, with only 18 studies included in the most recent Cochrane review (Flodgren et al., 2011). The use of local opinion leaders can be challenging, as the feasibility of identifying opinion leaders in different settings is uncertain (Grol & Grimshaw, 2003). While the use of opinion leaders has shown modest effects in changing practice (median improvement of 12%), the authors concluded that there was insufficient evidence regarding how to optimise the

effectiveness of this intervention, as the role of the opinion leader was often not clearly described (Flodgren et al., 2011).

E. Knowledge Brokering

A *Knowledge Broker* is a research intermediary who acts as a catalyst for change by establishing and nurturing connections between researchers and end users (Choi et al., 2005). A knowledge broker should be responsive to stakeholders' needs; therefore the knowledge broker's specific activities are tailored to the local context, incorporating best practices into existing routines (Russell et al., 2010). Despite growing interest in knowledge brokers, there is little evidence regarding the effectiveness of knowledge brokers on changing behaviours or improving patient outcomes (Dobbins et al., 2009). Many factors remain unclear, such as the personal attributes required for a successful knowledge broker, and the most appropriate organisational context in which to use this intervention (Willems, Schroder, Post, van der Weijden, & Visser-Meily, 2013). Further research regarding the optimal characteristics for successful implementation of this intervention is required.

F. Audit and feedback

Audit and feedback is defined by the Cochrane EPOC Group as "any summary of clinical performance of health care over a specified period of time" (2002). It is a commonly used behaviour change intervention that can be used to identify gaps in practice, and to demonstrate to healthcare professionals how practice can be improved (Grimshaw et al., 2012). Audit and feedback is useful as an objective measure of performance, as opposed to self-report, with research showing that healthcare professionals often overestimate their performance by around 20% to 30% (Adams, Soumerai, Lomas, & Ross-Degnan, 1999).

The effectiveness of audit and feedback on changing behaviour has been reviewed several times in the past decade, with generally small effects. In 2006, two separate reviews showed a median improvement of 7% (Grimshaw et al.) and 5% (Jamtvedt, Young, Kristoffersen, O'Brien, & Oxman) respectively. Similarly, the most recent update of the Cochrane review included 140 studies, showing small but potentially important improvements in professional practice, with a median improvement of 4.3% (Ivers et al., 2012). As it currently remains unclear exactly how audit and feedback results in behaviour change, it has been suggested that future research should directly compare different ways of providing feedback (Ivers et al., 2012).

G. Reminders

The Cochrane EPOC group defines *reminders* as "patient or encounter specific information, provided verbally, on paper or on a computer screen, which is designed or intended to prompt a health professional to recall information" (2002). Some advantages of reminders are that they can reduce the cognitive load for practitioners, and are low-cost (Shojania et al., 2011).

Reviews of the effectiveness of reminders have shown small to modest effects. Two early systematic reviews showed a similar effect size, of 13% (Grimshaw et al., 2001) and 14.1% (Grimshaw et al., 2006) respectively, in improving performance. These results contrast with the most recent Cochrane review of 28 studies, which found a median improvement of only 4.2% (Shojania et al., 2011). One possible explanation for these varied results is the inclusion criteria used. The earlier reviews tended to include all forms of computerised reminders and decision support together, including computer-generated paper reminders and e-mail alerts sent to providers, along with reminders generated at the point of care, whereas the Shojania and colleagues (2011) review focused only on reminders that prompt providers at the point of care.

Like audit and feedback, it is currently unclear which factors relating to reminders have the greatest impact. Researchers have acknowledged that further research is need to identify the salient features of computerised reminders, in order to prioritise and optimise their effects (Grimshaw et al., 2012; Shojania et al., 2011).

2.6.1.2 Interventions Targeting Policy-makers. A number of interventions have been developed that attempt to increase the use of evidence in decision-making at a policy or organisational level. These include summaries of systematic review evidence that are designed to improve the accessibility of the findings of systematic reviews (often referred to as information products), and changes to organisational structures, such as employing specialist groups to synthesise the evidence to inform local decision-making (Dobbins et al., 2009; Murthy et al., 2012). Evidence regarding the effectiveness of these policy-level interventions is limited, however.

For example, when investigating strategies to implement public health policies and programs, it was found that only the organisational intervention (providing tailored and targeted messages to decision makers) was effective, compared to strategies aimed at the individual (Dobbins et al., 2009). Further research is needed to investigate which factors led to the success of the strategy, such as the format and presentation of information, and organisational characteristics.

More recently, in a systematic review of eight studies, it was found that a printed summary of systematic review evidence may be effective in improving evidence-based practice when there is a single clear message, if the change required is relatively simple, and if there is a growing

awareness by users of the evidence that a change in practice is required (Murthy et al., 2012). However, a multifaceted intervention may be required, if the intention is to meet more complex aims, such as the development of awareness, knowledge and skills of systematic review evidence, though there is insufficient evidence to support this approach. Although there are several examples of summaries of systematic review evidence that are endorsed by national healthcare bodies (e.g The National Stroke Foundation), it is unclear whether these efforts have been effective in improving the uptake of research recommendations.

While there is some evidence that interactions between researchers and policy makers can improve the use of evidence at the level of the organisation, further research is required into the specific characteristics that lead these interventions to be successful.

2.6.1.3 Interventions Targeting Patients. The most common intervention targeting patients is the use of *decision aids*. Decision aids are a type of decision support intervention designed to help people make choices about health treatment options, and consequently increase a patients' participation in the decision-making process (Allaire et al., 2011).

Two systematic reviews of patient decision aids, also known as shared decision-making (SDM) tools, have concluded that they improve patients' awareness and understanding of the benefits and disadvantages of their treatment options, and increase people's involvement in the decision- making process (O'Connor et al., 2009; Stacey et al., 2011). In spite of the growing interest in shared decision-making, few health professionals practice it, and there are only a few studies on implementing SDM in clinical practice (Légaré et al., 2010)

2.6.2 *Which Interventions are Most Effective?*

Despite abundant research into the effectiveness of specific behaviour change interventions, there is little strong evidence supporting the use of one intervention over another, and little evidence to show which interventions are most effective for a specific setting. In an overview of 54 reviews, most interventions studied were shown to have some effects, with an average of approximately 10% improvement (Grol & Grimshaw, 2003). However, no single intervention was superior for all changes in all settings (Grimshaw et al., 2006; Grol & Grimshaw, 2003).

As more research has been conducted, the cumulative results of effectiveness studies have changed. For example, while it was initially thought that printed educational materials were largely ineffective (Freemantle et al., 1997), the most recent Cochrane review showed a small positive effect on professional practice outcomes (Giguère et al., 2012). In an example of the opposite trend, reminders were found to be one of the most effective interventions in a 2006 review (Grimshaw et

al., 2006), but were recently found to be only mildly effective (4.2%) (Shojania et al., 2011). For a more detailed overview of the effectiveness of interventions that summarises the Cochrane reviews for each intervention, please refer to Grimshaw and colleagues (2012).

2.6.3 *Are Singular or Multifaceted Interventions More Effective?*

There has been debate about whether single or multifaceted interventions are more effective in changing health professionals' behaviour. Multifaceted implementation interventions are the combination of two or more singular intervention types, such as printed educational materials, educational meetings and audit and feedback. Due their multiple components, multifaceted interventions are likely to be more costly than single interventions (Grimshaw et al., 2012).

Some researchers have proposed that multifaceted interventions are more likely to be effective than single interventions, as they address multiple barriers to implementation. Davis and colleagues' systematic review (1995) of continuing medical education strategies concluded that multifaceted interventions were more likely to be effective. Similarly, Wensing and colleagues (1998) undertook a systematic review of 61 randomised controlled trials and controlled before and after studies investigating the effectiveness of introducing guidelines in primary care settings, concluding that multifaceted interventions that combined more than one intervention tended to be more effective, but were probably more expensive.

Conversely, other reviewers have found that multifaceted interventions are *not* always more effective. In their overview of systematic reviews relating to implementation interventions, Grimshaw and colleagues (2006) found that the effectiveness of multifaceted interventions did not increase incrementally with the number of components. These findings were echoed in a systematic review of implementation interventions in public health settings, where single strategies were shown in some circumstances to be as effective as complex, multifaceted ones (Larocca, Yost, Dobbins, Ciliska, & Butt, 2012). Hence, it remains unclear *when* a single or multifaceted intervention will be more effective, and may depend upon the behaviour, professional group and clinical setting being targeted.

2.7 Selection of Interventions

While most interventions were selected intuitively in the early history of implementation research, it is now widely accepted that the selection of interventions should be based on a tailored approach. That is, interventions should be tailored to the underlying implementation barriers. What is lacking,

however, is convincing evidence about the best way to identify these barriers and how to tailor the interventions to these barriers most effectively.

In a systematic review of 32 studies, Baker and colleagues (2015) investigated the effectiveness of interventions tailored to address identified barriers to change on professional practice or patient outcomes, finding that tailored interventions are more likely to improve professional practice when compared to no intervention or the dissemination of guidelines or educational materials. The authors concluded that the effect of tailored implementation was variable, tending to be small to moderate (Baker et al., 2015). This was an update of a previous review of 26 studies, which had similar findings (Baker et al., 2010). Both reviews identified gaps in the research, with insufficient evidence on how to identify barriers, which were the most important barriers to target, and if the barriers had actually been addressed by the intervention chosen. In addition, further research is needed to determine the effectiveness of tailored interventions in comparison with other interventions (Baker et al., 2010).

Some attempts have been made to identify the links between barrier identification and the selection of interventions, in order to provide guidance for intervention development. One option is to use theory to inform the design of implementation interventions. For example, a four-step method for developing a behaviour change intervention based on the TDF has been described. These four steps are: identifying the problem, assessing the problem using the TDF, forming possible solutions based on the modifiable barriers, and evaluating the selected intervention (French et al., 2012).

Despite these attempts to link barrier identification and intervention selection, KT research generally continues to demonstrate unclear methodological design and reporting (Colquhoun, Squires, Kolehmainen, Fraser, & Grimshaw, 2017). Less than 10% of studies on guideline implementation explicitly reported a theoretical rationale for the selected KT intervention (Davies et al., 2010). As a result, the generalisation of evidence related to the effectiveness of KT interventions is questionable (Urquhart, Porter, Grunfeld, & Sargeant, 2012). Furthermore, research suggests that interventions are only described in detail 5% to 30% of the time, leading to issues with replicability (Albrecht, Archibald, Arseneau, & Scott, 2013). In response to these reporting and methodological issues, the Workgroup for Intervention Development and Evaluation Research (WIDER) outlined a four-pronged method for behaviour change intervention reporting (2008). The WIDER recommendations provide a framework to identify and provide detailed reporting of the essential components of behaviour change interventions, including: detailed description of interventions, clarification of assumed change process and design principles, access to intervention

manuals/protocols, and a detailed description of active control conditions. Two other reporting guidelines have since been developed to guide reporting of interventions. The Template for Intervention Description and Replication (TIDieR) checklist consists of 12 items aimed at improving reporting of interventions to allow for replication (Hoffmann et al., 2014). The Standards for Reporting Implementation Studies (StaRI) Statement is more specific to the reporting of implementation interventions, and consists of 27 items (Pinnock et al., 2017).

Future research into the effectiveness of implementation interventions should explicitly identify the rationale for the interventions, focusing on greater use of theory to understand barriers and design interventions (French et al., 2012; Scott et al., 2012). Furthermore, there is a need for improved reporting of interventions so that findings of these studies can be replicated.

2.7.1 *Using the BCW to Select and Design Interventions*

The BCW framework, introduced previously, can be used to select and design behaviour change interventions. The BCW proposes that interventions can have one or more of nine behaviour change functions; for example, interventions may seek to *educate*, *persuade*, or *train* healthcare professionals to achieve change. There are then seven categories of policy that could enable those interventions to occur (e.g., *Service Provision* and *Regulation*). The process of intervention selection is described in *The Behaviour Change Wheel: A Guide to Designing Interventions* book (Michie, Atkins, & West; 2014), and linked to the 'Behaviour Change Taxonomy', which includes 93 behaviour change techniques (Michie et al., 2013).

Although the BCW is a relatively new way of conceptualising the numerous behaviour change theories available, it has proven to be useful in helping to both understand the barriers to behaviour change and in designing successful behaviour change interventions (Duncan et al., 2012; Dyson et al., 2010). It has recently been used to design a health coaching intervention for gestational diabetes (Handley et al., 2016) and education guidelines in hospital cardiac rehabilitation (Mc Sharry et al., 2016). The BCW has also been used to determine effective components of behaviour change interventions retrospectively (Chauhan et al., 2017), showing that there is potential for a wide application of this framework.

While it has not been explicitly compared to other methods of selecting interventions, the BCW framework fits with the generally agreed-upon core components of implementation interventions (i.e., theory-based and able to be tailored to barriers), and in this way is useful for researchers and clinicians alike. As previously addressed, further research is needed to establish how far the BCW can lead to more efficient design of effective interventions.

2.7.2 *Summary*

To date, implementation interventions have had limited and varied effects. While there is emerging evidence that interventions should be tailored to the underlying barriers, there is little evidence guiding researchers how to effectively select interventions. Furthermore, reporting and methodological issues exist, whereby there is often a lack of explicit rationale for the intervention choice and poor description of the intervention itself. As such, it is difficult to replicate these findings, and conclusions may not able to be generalised. Therefore, conclusions about interventions cannot be taken on their own without considering the characteristics of the practice being implemented, the providers, the participants and the organisation where the change is being implemented. The BCW framework, which has been used to design effective and evidence-based behaviour change interventions, can help researchers overcome these methodological and reporting issues.

2.8 Conclusion

Although there is much that remains unanswered in the field of implementation, it is widely accepted that concerted efforts to change practice to close evidence-practice gaps in healthcare are necessary. There is support for theory-based models or frameworks to guide implementation efforts. While it is unknown which behaviour change interventions are the most effective, and whether single or multifaceted interventions will be more successful, there is evidence that implementation interventions are more effective when they are tailored to address known barriers. Therefore, it is essential that barriers and facilitators to evidence uptake are prospectively assessed in the specific population in which change is desired.

Two theory-based frameworks are particularly useful in designing implementation interventions, having emerged from the plethora of implementation models and frameworks. The Theoretical Domains Framework is both effective in determining barriers to change and in designing implementation interventions, and the Behaviour Change Wheel is useful in selecting and designing tailored implementation interventions. As they are both based on theory, together these frameworks may also be useful in explaining the effects of implementation efforts, which is often lacking in published implementation literature.

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Chapter 3: Implementation in Stroke, Rehabilitation and Aphasia

To date, knowledge translation and implementation have received little attention in the field of aphasia. Hence, it is necessary to consider the broader literature on implementation in stroke, rehabilitation, and allied health, including speech pathology. This chapter will provide an overview of the evidence-practice gaps in stroke services, and review and critique the various types of implementation interventions and their application to stroke, allied health and speech pathology, in order to set the context for implementation in aphasia. Then, the implementation literature in aphasia will be summarised and gaps will be identified, showing that key questions remain unanswered.

3.1 Knowledge Translation and Implementation in Stroke and Rehabilitation

Knowledge Translation is in its infancy in stroke and rehabilitation, and the effectiveness of behaviour change interventions aimed at rehabilitation clinicians have not been well studied. This section will provide a summary of some of the evidence-practice gaps in stroke services, and a brief overview of implementation studies in stroke and rehabilitation, in order to determine what findings may be applicable to aphasia.

3.1.1 *Evidence-Practice Gaps in Stroke and Rehabilitation*

As with other areas of healthcare, there are many areas of stroke with substantial evidence-practice gaps. There is also evidence of an association between adherence to recommended stroke management guidelines and health outcomes in both acute and rehabilitation settings. Therefore, it is important that efforts are made to close these evidence-practice gaps. Examples of evidence-practice gaps in stroke services are described below.

In the acute stroke setting, significant evidence-practice gaps have been identified in the provision of stroke unit care and thrombolytic therapy. Acute care in a dedicated stroke unit has been found to reduce mortality, morbidity and dependency when compared with alternative services (Stroke Unit Trialists' Collaboration, 2007). The importance of stroke unit care was also highlighted in an Australian study, which concluded that receiving stroke unit care and aspirin within 48 hours of ischemic stroke were process indicators that most strongly predicted independence at discharge (Cadilhac, Kilkenny, Churilov, Harris, & Lalor, 2010). The provision of stroke unit care is a Grade A recommendation in several internationally recognised clinical practice guidelines, including the SIGN 108 (Scottish Intercollegiate Guidelines Network, 2008), the Australian Clinical Guideline for Stroke Management (National Stroke Foundation, 2010), and the American Stroke

Association's clinical guideline for acute stroke (Jauch et al., 2013). Despite the benefits, an Australian audit revealed that only 67% of stroke patients received care on a dedicated stroke unit (National Stroke Foundation, 2015). While this showed improvement from previous audit results of 58% (National Stroke Foundation, 2013), a considerable gap remains. Similar gaps in the provision of stroke unit care have been found internationally. For example, in Canada, only 23% of eligible patients received stroke unit care in 2008-2009 (Canadian Stroke Network, 2011).

As with acute stroke care, there are also evidence-practice gaps in stroke rehabilitation. A large Canadian study of 1800 stroke rehabilitation clinicians indicated that best practices are not routinely being applied in several areas, including constraint-induced upper limb therapy, screening for dysphagia and unilateral spatial neglect, and driver assessment, retraining and participation (Menon, Bitensky, & Straus, 2010). More specifically, a survey of Canadian occupational therapists revealed that less than 6% of clinicians offered driving retraining, despite two-thirds of persons with stroke being left with impairments impacting on driving (Petzold et al., 2010). In Australia, an audit of 111 rehabilitation units showed that only 38% of hospitals reported access to psychologists and only 50% of patients had mood assessments, showing minimal improvements since previous audits (National Stroke Foundation, 2012). These Australian results are comparable to findings in the US, where average compliance with post-acute rehabilitation guidelines was 69.5% (Duncan, 2002).

In rehabilitation, greater levels of adherence to stroke guidelines are associated with improved patient outcomes. In both the United States and Australia, levels of compliance with rehabilitation guidelines have been significantly associated with recovery as measured by the Functional Independence Measure (Duncan, 2002; Hubbard et al., 2012). Using results of the Australian Stroke Rehabilitation Audit data, an Australian study found that rehabilitation units that adhered to evidence-based management in relation to activities of daily living, balance, and secondary prevention were more likely to provide better stroke recovery outcomes (Hubbard et al., 2012). Differences in levels of guideline compliance have been found in different rehabilitation settings, whereby compliance within the nursing home setting was substantially worse than for inpatient rehabilitation settings (Duncan, 2002).

Hence, there are significant evidence-practice gaps in stroke management across the continuum of care that need addressing through implementation efforts.

3.1.2 *Effectiveness of Implementation Studies in Stroke*

There has been in increase in the amount of research investigating the effectiveness of implementation interventions aimed at stroke and rehabilitation clinicians, and similar issues to the

broader implementation literature have emerged. It is unclear which types of implementation strategies are most effective, and whether multifaceted or single interventions should be used.

There are currently no systematic reviews on the effectiveness of implementation interventions aimed at improving stroke related care. However, there are published protocols for systematic reviews into the effects of implementation interventions in stroke rehabilitation (Cahill, Carey, Lannin, Turville, & O'Connor, 2017) and acute stroke settings (Luker et al., 2017). A previous review of rehabilitation studies evaluating implementation strategies included only three studies (of five in total) pertaining to stroke, leading to few firm conclusions (Sudsawad, 2007). Several more studies have been conducted since the original review, many of which showed positive outcomes. Some examples of implementation studies in stroke are described below.

A single-blind cluster randomised controlled trial focused on guideline implementation in 19 Australian acute stroke units (Middleton et al., 2011). In the active group, a multifaceted intervention was implemented, which incorporated team building workshops, a standardised interactive education programme, and treatment protocols to manage fever, hyperglycaemia, and swallowing dysfunction. The control group received only passive dissemination of existing guidelines. Results showed that stroke patients in the intervention group were significantly less likely to be dead or dependent at 90 days than control stroke patients. Although pre-implementation barriers were identified (Dale et al., 2015), it is unclear how the intervention was tailored to address these barriers. In a follow-up study evaluating the 'translational scale-up' of the implementation interventions, 36 New South Wales acute stroke units participated, showing significantly increased use of all three evidence-based clinical protocols (Middleton et al., 2016). A cross-sectional survey of participants that were not included in the implementation intervention (but had access to the resources) showed that only 20% reported successful implementation of all three protocols (Middleton, Bruch, Martinez-Garduno, Dale, & McNamara, 2017). This further demonstrated that active implementation efforts were more successful than passive dissemination of resources.

In the United States, a cluster randomised trial of 31 rehabilitation units compared whether a team training intervention in stroke rehabilitation was associated with improved patient outcomes (Strasser et al., 2008). The multifaceted intervention included workshops, action plans and access to support via consultations. At the conclusion of the study there were significantly improved functional outcomes for stroke patients in the intervention group, but no significant difference in length of stay or rates of community discharge. This study was limited in its methodology, as the intervention was not tailored to barriers to implementation, and it is unclear how the intervention is thought to have worked to improve patient outcomes. Also, it is unclear why the authors chose this intervention over other intervention options. Furthermore, as there is no clear description of the

intervention, it is not able to be replicated.

In Canada, five stroke inpatient rehabilitation centres participated in a multi-site pilot implementation study (Bayley et al., 2012). At each site, a clinician was identified as a "local facilitator" to promote implementation of evidence-based recommendations in three high-priority areas of practice. The implementation strategy was selected at the discretion of the individual facilitators, and not described in the article. Barriers to implementation were evaluated at the completion of the project, and included time, staffing, and resources. Interestingly, there was variation in perceptions of barriers across stakeholders; nurses noted more training and staffing issues, and managers perceived fewer barriers than frontline clinicians. This was a qualitative study reporting on the barriers to implementation, and therefore no clinical outcomes were reported. Furthermore, as the implementation strategies employed by the facilitators were not reported, and theses strategies were not prospectively tailored to known barriers, it is difficult to determine whether and how the strategies may have resulted in behaviour change. However, the results of the study had several important implications for implementation in rehabilitation, including the need to include managers in the process, optimise time efficiency, and provide assistance in prioritising therapeutic activities (Bayley et al., 2012).

Also in Canada, a behaviour-change intervention was implemented with 20 acute care occupational therapists treating patients with post-stroke unilateral spatial neglect (Petzold et al., 2012). Using Graham's Knowledge-To-Action model (Graham et al., 2006) as a guide, participants took part in an interactive multifaceted intervention that was tailored to identified barriers. An 8-week follow-up and post-intervention assessment was then completed. Results of this repeated measures study showed improved knowledge of best practice unilateral spatial neglect management and evidence-based practice self-efficacy, but patient outcomes were not measured.

A recent Australian cluster randomised trial of 10 hospitals compared whether an education-only (single) intervention versus a multifaceted intervention was more effective in improving post-stroke assessment of rehabilitation needs (Lynch, Cadilhac, Luker, & Hillier, 2016). The multifaceted intervention included interactive workshops, the identification of local barriers and tailored strategies to address these, site champions, and reminders. Results showed that both interventions were effective in increasing the proportion of patients who received an assessment of their rehabilitation needs, but there was no significant difference between the multifaceted and the education-only intervention. The strengths of this study included clear reporting of the implementation interventions used, their use of the Template for Intervention Description and Replication (TIDieR) reporting checklist (Hoffmann et al., 2014), and that the multifaceted intervention was tailored to implementation barriers. However, it was unclear why there was no

difference between the two interventions.

3.1.3 *Comparison of Studies*

The above studies represent a snapshot of the available stroke-related implementation studies, and show the diversity of approaches that can be taken and the limitations of some studies in this emerging field. A comparison of the features of these studies follows below.

Firstly, the use of theory and tailoring of implementation interventions was inconsistent. Three of the five studies (Bayley et al., 2012; Middleton et al., 2011; Strasser et al., 2008) did not describe any behaviour-change theory or model of KT to guide their implementation strategies, whereas the occupational therapy study (Petzold et al., 2012) used Graham's model of KTA (Graham et al., 2006), and the rehabilitation needs assessment study used the 'implementation of change' theoretical model (Lynch et al., 2016). This finding is consistent with the Sudsawad review (2007), where only one of the five studies explicitly used theory to guide the intervention. Furthermore, two of the studies (Bayley, et al., 2012; Strasser et al., 2008) did not identify barriers to implementation prior to developing their intervention, therefore did not take a tailored approach as defined by Baker and colleagues (2010). In the Middleton study (2011), mention was made of the barriers, but these were not reported until a later publication (Dale et al., 2015), and it was unclear how the intervention was tailored. Again, only the Petzold (2012) and Lynch (2016) studies actively sought to identify barriers and tailor their intervention prospectively. It is possible that the methodology and description of intervention design was clearer in these latter studies than the others, as they both used a KT model to guide implementation. This adds weight to the argument that the use of a model or theory can assist in making studies more replicable.

Finally, while it has not yet been established whether a single or multifaceted intervention is more effective, all except one study (Lynch et al, 2016) used *only* a multifaceted approach. This may be due to the fact that complex multifaceted interventions were necessary to target different barriers and different levels (such as the individual, organisation, and team), but the rationales for these decisions were not reported.

3.1.4 *Summary*

While it is important to have an overview of the body of research relating to behaviour change interventions in stroke, few firm conclusions can be reached. As in the broader implementation literature, there is no single type of intervention that is more effective in changing clinician behaviour than any other; however there appears to be a preference for choosing multifaceted approaches. In the one study that compared a single intervention (education-only) with a multifaceted approach, however, there was no different in the outcomes, indicating that a

multifaceted intervention is not always more effective. In general, there is inconsistent use of theory, tailoring of interventions, and poor reporting of intervention protocols.

Due to the complex nature of rehabilitation and the different characteristics of the multitude of professionals involved, it is difficult to generalise any findings from one setting to another, and from one profession to another. This has implications for implementation interventions targeted at speech pathologists working with stroke patients, as previous stroke implementation research may not be directly applicable.

3.2 Implementation in Allied Health and Speech Pathology

This section will focus on implementation within allied health and, more specifically, speech pathology. While implementation research is limited in speech pathology, it is more established in other allied health professions such as pharmacy, physiotherapy, and occupational therapy. Overall, reoccurring issues with reporting, use of theory and outcome measures can be seen in the allied health literature, which will be discussed below. Then, a more detailed review and critique of the speech pathology-specific studies will follow, in order to set the context for aphasia.

3.2.1 *Knowledge Translation and Implementation in Allied Health*

Six systematic reviews into the effectiveness of knowledge translation in allied health have been conducted. The original, conducted by the Cochrane Collaboration (Thomas et al., 2009), offers limited applicable information in relation to allied health professional practice, as 17 of the 18 included studies targeted nursing staff and physicians. In a more recent review (Dikkers, Schaafsma, van Tulder, & Anema, 2016) into implementation interventions for treatment of lower back pain, only three of the nine included studies included allied health staff (physiotherapists), with the remainder of studies targeted at physicians or nursing staff. In this review, there was no difference found between multifaceted interventions and controls, and no significant practice effects, but it is not possible to determine the effects for allied health clinicians (Dikkers et al., 2016). Four additional systematic reviews that have a greater focus on allied health are compared below.

A 2008 systematic review of KT studies pertaining to allied heath included 14 studies, which comprised randomised controlled trials, controlled clinical trials, controlled before and after studies, and interrupted time series (Hakkennes & Dodd, 2008). Of these, eight studies were focused on pharmacists, three on physiotherapists, two on dietitians and one on speech pathologists. In this review, most of the effects reported for patient and process outcomes were small, and in favour of the intervention group.

Another systematic review conducted in 2008 focussed on the effectiveness of KT in two

disciplines, physiotherapy and occupational therapy (Menon, Korner-Bitensky, Kastner, McKibbon, & Straus, 2009). In this review, 12 studies were eligible for inclusion. Results suggested that multi-modal active educational methods were more likely to be effective for increasing knowledge and use of best practice for physiotherapists, compared with single or passive methods. However, there was insufficient data to draw any conclusions for occupational therapy (Menon et al., 2009).

A subsequent systematic review included 32 studies of varying methodological designs, including experimental, quasi-experimental, and non-experimental designs (Scott et al., 2012). Studies from five disciplines were included, comprising pharmacy (n=12), physiotherapy (n=9), occupational therapy (n=4), dietetics (n=3), and speech pathology (n=2). A further two studies targeted both physiotherapists and occupational therapists. The majority of studies demonstrated mixed effects on primary outcomes, with only four studies showing significant positive effects. All of the interventions used in the four positive studies were aimed at the level of the professional, and included educational components, such as educational materials, educational meetings and educational outreach visits.

A systematic review of implementation strategies in aimed at community pharmacists (22 studies) showed that educational interventions were used most commonly, but that computerised decision support systems were most effective type of implementation strategy (Watkins, Wood, Clifford, & Schneider, 2016). Most studies were multifaceted and the overall outcomes were moderately positive.

When compared, there are a number of similarities between these reviews. All four reviews found that educational interventions were favoured. Furthermore, all found that the majority of primary outcomes were identified as professional or process outcomes, with most studies not measuring patient outcomes at all. Only one of the included studies reported developing their implementation strategy based on identified barriers to change in the Hakkennes and Dodd (2008) review, and no studies met this criteria in the Watkins and colleagues (2016) review. However, this specific feature of tailoring the intervention to barriers, was not described in the Scott (2012) or Menon (2009) reviews. The quality of studies was also evaluated in the majority of reviews. While reporting issues were briefly mentioned in the Hakkennes and Dodd (2008) article, Scott and colleagues (2012) took a more systematic approach to this problem by critiquing studies using the Workgroup for Intervention Development and Evaluation Research (WIDER) Recommendations (Workgroup for Intervention Development and Evaluation Research (WIDER) Group, 2008). As described previously in Chapter 2, these recommendations consist of four categories and are designed to improve reporting of the content of behaviour change interventions. In the Scott and colleagues (2012) review, none of the studies satisfied the four WIDER recommendations,

indicating significant reporting issues. Although they did not specifically evaluate studies using the WIDER framework, the Watkins (2016) and Menon (2009) reviews also reported on the evaluation of bias and quality of the included studies, reporting that the majority of studies had methodological weaknesses including an incomplete rationale for the selection of the implementation strategy.

The findings of these reviews also showed several differences. Although both the Hakkennes (2008) and Scott (2012) reviews found a similar proportion of single KT interventions compared to multifaceted approaches (approximately 50%), the majority of studies in Watkins (2016) review (82%) were multifaceted, whereas only a third of included studies in the Menon (2009) review were classed as multifaceted. Overall, in the Hakkennes and Dodd review, there was limited ability to identify one implementation strategy as being more effective than another. However, the Menon study found that multifaceted education interventions were more than single interventions effective for physiotherapists, and the Watkins study showed that computerised decision support tools were most effective for pharmacists. There were also differences in the effect sizes found in these reviews, varying from small (Hakkennes) to moderate (Watkins), to mixed (Dodd and Menon), possibly due to the heterogeneous nature of the implementation targets, the different allied health disciplines, and the variety of methodologies included in these reviews.

3.2.2 ***Summary of Allied Health Literature***

Few firm conclusions that can be reached from the allied health implementation literature. While educational interventions are used most commonly, and are sometimes effective (Scott et al., 2012), there is conflicting evidence about whether any specific type of implementation intervention is more effective than any other. However, an educational intervention may incorporate a number of different intervention functions according to the Behaviour Change Wheel (Michie, van Stralen, & West, 2011), such as *persuasion* and *enablement*, but this level of detail about the interventions was not reported in these studies. Therefore, more details about the interventions are necessary to determine whether they can be compared and why they may or may not have been effective.

There are also varying proportions of single versus multifaceted interventions in allied health, and reviews have shown contrasting results regarding their effectiveness. One review found no difference in the effectiveness of single versus multifaceted approaches (Hakkennes & Dodd, 2008), while another found that multifaceted strategies were more effective for physiotherapists (Menon et al., 2009). Overall, methodological and reporting issues appear to be of concern. In particular, the lack of data on patient outcomes was highlighted as an issue (Hakkennes & Dodd, 2008; Scott et al., 2012), in addition to poor reporting of the rationale for selecting an implementation strategy (Watkins et al., 2016). At this point in the development of implementation

research in allied health, little can be applied to speech pathology, except for the need to adhere to reporting recommendations, and to consider the inclusion patient outcomes as an outcome measure where possible, and that educational interventions may be effective. In addition, further clarity about the nature of interventions is needed.

3.3 Speech Pathology Implementation Studies

Only six speech pathology-based implementation studies have been identified, which are summarised in Table 3-1. All of these studies investigated the implementation of behaviour change interventions on speech pathology practice areas. The most recent systematic review of allied health studies (Scott et al., 2012) identified two speech pathology focused studies (Molfenter, Ammoury, Yeates & Steele, 2009; Pennington et al., 2005). One previous implementation study had been conducted (Simmons-Mackie et al., 2007), although it is unclear why it was not included in the systematic review. Three additional implementation studies have been conducted since the systematic review was published. A further two studies evaluating a broad implementation approach were identified (Bland et al., 2013; Jukes et al., 2012), but did not meet the criteria of a prospective implementation design.

The first implementation study conducted in speech pathology compared the clinical and cost-effectiveness of two training strategies in promoting research use in post-stroke dysphagia (Pennington et al., 2005). Using a pragmatic cluster randomised trial design, 17 speech therapy departments received either standard training on the principles of evidence-based practice and critical appraisal of published guidelines, or standard training plus teaching on management of change principles. The latter training strategy was based on Rogers' (2003) Diffusion of Innovation theory. Improvement in guideline adherence was determined using a retrospective audit tool developed for the project. The results of the study showed no significant effect of either of the training strategies on the primary outcome measure. No patient outcomes were measured, and no information on barriers and facilitators to implementation was collected.

The first speech pathology implementation study conducted in the field of aphasia took place in Canada (Simmons-Mackie et al., 2007). Conducted in three different settings (acute, rehabilitation, and long-term care), a team-based intervention was implemented to improve communicative access for people with aphasia. The intervention used a multifaceted approach, including a 2-day training session for each team, development of communicative access improvement goals and materials, and on-site follow-up and support from a project speech pathologist. By increasing knowledge and skills, the authors aimed to change practice and improve patient participation. Outcomes were measured by qualitative methods including observation, focus

groups, and open-ended interviews. Whilst all teams initially showed improved knowledge and understanding of communicative access, only the rehabilitation and long-term care teams achieved their communicative access improvement goals after the 4-month follow-up. The acute care team reported less success in implementation, and identified more barriers to change. Limitations to this study were that no theory or model of behaviour change was used, and outcome measures did not include patient outcomes. While participants reported examples of increased participation of people with aphasia, there were no quantitative measures verifying these reports. Furthermore, although goals for improved communicative access were identified and tailored to the individual teams, barriers to behaviour change were not identified prior to the intervention, which may have improved outcomes.

Table 3-1. Summary of Speech Pathology Implementation Studies

Author (year) Country	Study design (Sample size)	Theoretical Approach	Tailored to barriers?	Single/ multifaceted intervention	EPOC intervention(s)	Main outcomes (methods)	Effect on main outcome
Pennington et al., (2005), UK	Randomized controlled trial (34 speech pathologists)	Diffusion of Innovation theory (Rogers, 2003)	No	Single	Educational meetings	Professional/ Process (Retrospective file audit)	No significant effect of either of the training strategies
Simmons-Mackie et al., (2007), Canada	Qualitative study (37 members of multidisciplinary team, including 5 speech pathologists)	None reported	No	Multifaceted	Educational outreach visits Tailored strategies	Professional/ Process (Observation, focus groups, and open-ended interviews)	Positive changes reported for rehabilitation and long term care settings.
Molfenter et al., (2009), Canada	Qualitative case study (4 speech pathologists)	Knowledge To Action Framework (Graham et al., 2006)	Yes	Multifaceted	Educational outreach visits with some tailoring to barriers	Professional/ Process (Interviews)	Positive results reported, including improved learning and service-delivery.
Jensen et al., (2014), Denmark	Mixed methods study (105 members of multidisciplinary team, unknown number of speech pathologists)	None reported	No	Multifaceted	Educational meetings Educational materials Local consensus processes Tailored strategies	Professional/ Process (Interviews & Questionnaires - Nursing staff only)	Positive results reported, including improved knowledge of aphasia and improved communication experience.
Horton et al., (2016), UK	Cluster controlled feasibility study - mixed methods (28 members of multidisciplinary team,	None reported	No	Multifaceted	Educational outreach visits Educational materials	Professional/ Process (Interviews, Focus groups and learning logs)	Positive results reported, including improved confidence in communication. Outcome measures were not all reliable and not

	including 1 speech pathologist)				Patient-mediated intervention	Patient (Observational videos - no baseline measures, & Outcome measures)	useful in showing differences between groups.
Wielaert et al., (2016), Holland	Qualitative before and after study – mixed methods (10 rehabilitation teams, including 19 speech pathologists acting as Knowledge Brokers)	Knowledge To Action Framework (Graham et al., 2006)	No	Multifaceted	Educational outreach visits Educational meetings Local consensus processes Local opinion leaders	Professional/ Process (Questionnaires & Development of care pathways) Patient (Recruitment rate - no baseline measure)	Positive results reported, including improved motivation, and 7 sites met recruitment targets. However only 1 site had care pathway.

The third speech pathology-specific implementation study used the knowledge-to-action (KTA) framework (Graham et al., 2006) to address a gap in dysphagia rehabilitation practice (Molfenter et al., 2009). This study was qualitative in design, and employed educational outreach visits. The participants were four clinicians who had previously received training for using surface eMG in swallowing rehabilitation but had not implemented these skills into practice. Following the KTA model, potential barriers to clinical implementation were identified, and the researchers then tailored the training sessions to suit each clinician. Post-intervention interviews showed positive results, including enhanced learning and improved service-delivery to patients. However, no patient outcomes were recorded, and it is unknown whether the changes reported by clinicians were sustained in the long-term.

A Danish implementation study (Jensen et al., 2014) involved training healthcare professionals in communication partner training to improve communicative access for people with aphasia in a hospital stroke unit. The implementation intervention involved stepwise training of hospital staff and the development of policies and procedures. Although multidisciplinary team-members were trained, including doctors, physiotherapists, occupational therapists and speech pathologists, only the outcomes for the nursing staff were described in the paper. Therefore, the results may not generalisable to speech pathology practice. Furthermore, there was no theoretical basis for the intervention described in the paper, and the implementation was not tailored to identified barriers. While the authors reported success based on interview and questionnaire responses, there was no quantitative measures of behaviour change and no patient outcomes were included in the study.

A similar study conducted in the UK (Horton, Clark, Barton, Lane, & Pomeroy, 2016; Horton, Lane, & Shiggins, 2015) trained both allied health and nursing staff working in a rehabilitation unit in using supported conversation techniques with people with aphasia. This was a cluster controlled feasibility study comparing implementation of a supported conversation intervention with usual care. Again, there was no reported theoretical basis for the selection of their intervention techniques, and barriers to implementation were not prospectively addressed. Additionally, as the study included only one speech pathologist (of 28 professionals who received training), the results are likely not generalisable to speech pathology practice. The outcome measures were predominantly based on self-report, but also included observations of interactions between health professionals and people with aphasia, and language scores. However, as there was no pre-intervention comparison, the videoed interactions could not be used to show change in the health professional's behaviour. In addition, the authors were unable to make power calculations from the chosen outcome measures. While the authors reported the model of implementation had

benefits, many barriers were identified, including patient factors, time constraints and the environment, which would need to be addressed before undertaking a larger trial.

The most recently published implementation study in aphasia also focussed on implementing a conversation partner training program (Wielaert, Van de Sandt-Koenderman, Dammers, & Sage, 2016). Ten rehabilitation centres participated, with two speech pathologists from each centre receiving training in the program and then acting as a Knowledge Broker for their team. The implementation strategy was selected based on the literature, and included educational meetings, local opinion leaders, and the development of local care pathways. Results indicated that the program's implementation was partly successful based on recruitment rates in seven of the centres, and was facilitated by the motivation of the rehabilitation team. However, only one centre had developed a care pathway, which may indicate the program was not fully embedded into usual practice. In addition, several barriers were reported, such as a lack of time and leadership, and the lack of suitable clients. As this was a new program, and there were no baseline measures or control group, it is unclear *how* the implementation strategies results in behaviour change for the clinicians involved in the project.

The research base for implementation in speech pathology is still developing. Of the six primary implementation studies, only one included a documentation audit as an outcome measure (Pennington et al., 2005), and the results of that study showed no effect of implementation. The remaining studies predominantly used self-report measures and lacked baseline measures, making it difficult to identify any actual practice change. Only two of the six studies included patient outcomes as outcome measures, and none investigated the long-term sustainability of the implementation approaches. Only one of the studies (Molfenter et al., 2009) tailored the implementation intervention to identified barriers, and two (Molfenter et al., 2009; Wielaert et al., 2016) used a model to design the implementation approach. While the Pennington (2005) study used theory to *inform* its intervention, the theory was not used to explain how behaviour change may have occurred, or why the intervention was not successful. Neither of the additional implementation studies that included speech pathologists described the interventions adequately, therefore it was not possible to determine how or why implementation was successful.

3.4 Summary

It can be seen that there is currently insufficient research into the key components for successful implementation in allied health and speech pathology. These key methodological components were identified in the literature review in Chapter 2, and include tailoring interventions to known barriers (Baker et al., 2010; Baker et al., 2015), using theoretical underpinnings to design and evaluate

interventions (e.g., the Theoretical Domains Framework, Cane, O'Connor, & Michie, 2012), and clearly reporting rationales for intervention choice in addition to describing intervention protocols (e.g., Pinnock et al., 2017). Hence, further research is needed into the use of theory and identification of barriers to tailor interventions, and the significant reporting issues should be addressed in future studies. Although the impact of a) using patient outcomes to measure the effectiveness of interventions, and b) monitoring change to evaluate long-term sustainability, is less well understood than the key implementation components described above, they may also be important considerations in future allied health implementation research.

3.5 Knowledge Translation, Implementation and Aphasia

3.5.1 *Introduction*

Knowledge Translation is a new area of research in the field of aphasia rehabilitation. It is currently unknown which implementation strategies may be effective in improving speech pathologists' update of aphasia management recommendations. To date, four implementation studies have been conducted in the field of aphasia (Horton et al, 2016; Jensen et al., 2014; Simmons-Mackie et al., 2007; Wielaert et al., 2016). Three of these studies lacked any reported theoretical basis for the selection of their intervention techniques (Horton et al, 2016; Jensen et al., 2014; Simmons-Mackie et al., 2007), and none of them prospectively designed the intervention to address known barriers to implementation. Additionally, as the outcome measures were predominately based on clinician self-report, it is not known whether any actual change in clinical practice occurred. In fact, two of these studies did not report any outcome data for speech pathologists at all (Horton et al, 2016; Jensen et al., 2014). As such, these studies are limited in their ability to explain whether, or how, they were able to bring about specific practice changes for speech pathologists.

There is evidence to support the *need* for implementation of research evidence into aphasia management, however. There are multiple examples of large evidence-practice gaps in several areas of aphasia practice. Additionally, clinicians have identified particular areas of concern within their practice, which could be prioritised for implementation. Furthermore, there is evidence of a multitude of barriers to practice change that could be considered when developing implementation interventions targeted at speech pathologists. These will be described in more detail below, in addition to areas of research that require further investigation.

3.5.2 *Evidence-Practice Gaps in Aphasia Management*

Post–stroke aphasia is often a chronic condition, with up to 60% of acutely aphasic patients continuing to present with aphasia over a year post-stroke (Ferro, Mariano, & Madureira, 1999;

Kertesz & McCabe, 1977). It is associated with poor functional recovery and poor quality-of-life (Engelter et al., 2006). Specifically, those with a post-stroke communication problem are significantly more likely to report negative changes in work activities, leisure activities, and relationships with family and friends (McKevitt et al., 2011). In 2011, the UK-based James Lind Alliance identified the Top 10 research priorities relating to life after stroke, ranking aphasia (*What are the best ways to help people recover from aphasia?)* as the third most important priority (Pollock, St George, Fenton, & Firkins, 2012).

Despite the poor outcomes for people with aphasia and the increasing recognition that aphasia is an important research priority, there are many gaps in aphasia practice. In the Australian context, evidence is emerging regarding the current state of aphasia services across the continuum of care. Several issues have been reported in both acute and rehabilitation settings.

In the acute setting, there are significant gaps in screening assessment, and timing and intensity of treatment provision. For example, recommendation 6.5.1a of the Australian Clinical Guidelines for Stroke Management states that, "*All patients should be screened for communication deficits using a screening tool that is valid and reliable*" (National Stroke Foundation, 2010). However, survey responses have indicated that over 70% of speech pathologists use informal initial aphasia assessment measures (Vogel, Maruff, & Morgan, 2010). While it is possible that these informal assessment methods *are* valid and reliable, this is yet to be tested. In addition, recommendation 6.1.2b states that, "*Treatment for aphasia should be offered as early as tolerated*" (National Stroke Foundation, 2010). An audit of treatment in acute hospitals showed that the average treatment time for people with aphasia was only 14 minutes per week (Godecke, Hird, Lalor, Rai, & Phillips, 2011). Alarmingly, 75% of people with aphasia who were appropriate candidates for aphasia therapy did not receive *any* intervention for the duration of their in-hospital stay (Godecke et al., 2011). Furthermore, only nine percent of speech pathologists provided daily therapy during their patient's stay in the inpatient acute hospital setting (Ferreira, 2012).

In rehabilitation, evidence-practice gaps have been identified in almost all areas of practice, with a practice audit finding 58% adherence to the Australian Clinical Guidelines for Stroke Management specific to aphasia (Hubbard et al., 2012). Areas of evidence-practice gaps included, but were not limited to, goal-setting, the provision of aphasia-friendly information, and the use of specific therapeutic approaches such as conversation partner training (CPT) and group therapy. Specifically, although 89% of patients were involved in setting their own rehabilitation goals (Stroke Foundation, 2016), this figure excluded those with severe communication disorders, so it is unclear how many people with aphasia participated in goal-setting. Furthermore, while 50% of patients or family members received tailored information regarding stroke (Stroke Foundation,

2016), only 36% of participants who received written information about *both* stroke and aphasia (Rose, Worrall, McKenna, Hickson, & Hoffmann, 2009). There were some discrepancies noted between the audit data and speech pathology surveys of practice. Although survey data showed that Conversation Partner Training (CPT) was the second most frequently used intervention, used in 92% of rehabilitation patients (Verna, Davidson, & Rose, 2009), only 75% of appropriate patients received CPT according to the national rehabilitation audit (Stroke Foundation, 2016). Similarly, group therapy was provided to only 21% of patients in the audit data (National Stroke Foundation, 2012), compared to 24% in a 2000 survey (Katz et al.) and 58.6% in a 2009 survey (Verna et al.). When compared to speech pathologists working in Canada, the USA and the UK, Australian speech pathologists provided the least amount of group therapy (Katz et al., 2000).

It can be seen that there are several areas of aphasia practice that vary considerably from evidence-based guideline recommendations. Furthermore, when data from different publications is compared, there is inconsistency in the extent to which these gaps exist. These inconsistencies may be due to the different methodologies used (for example, audit versus survey), or the use of ambiguous terminology. For example, conversation partner training (CPT) often refers to a specific technique where therapists can only receive training in Canada, therefore is unlikely that all of Australian speech pathologists who provide this therapy are adhering to the original treatment fidelity. These inconsistencies themselves are worth investigating further.

3.5.3 ***Priorities for Implementation***

In addition to considering the evidence-practice gap, it is important to consider the perceptions of key stakeholders (i.e., both clinicians and people with aphasia and their family members) when embarking on implementation, as consumer buy-in and positive attitudes may increase success (Soumerai & Avorn, 1990; Stead, Gordon, Angus, & McDermott, 2006). There has been some research into the preferences of clinicians and patients regarding priorities in the field of aphasia, but this is usually in the context of research priorities, rather than priorities for implementation efforts. For example, a recent survey found that Australian clinicians identified several research priorities, including ideal timing for various approaches, intensive treatment, web- and computer-based treatments, health systems research showing the impact of chronic aphasia and comparing cost effectiveness of treatments, and conversation partner training (Rose, Ferguson, Power, Togher, & Worrall, 2013). This next section will focus on two areas of practice, goal-setting and conversation partner training, as examples of *potential* priorities for clinicians and patients, in order to demonstrate that key questions about aphasia implementation priorities remain unanswered.

In the area of goal-setting, there is conflicting information between reported practice and

perceptions of importance. While the Australian stroke audit found that 89% of patients were involved in setting their own rehabilitation goals (Stroke Foundation, 2016), speech pathologists have reported that joint goal setting with people with aphasia is a significant challenge (Rose et al., 2013). Furthermore, many patients have reported feeling excluded from their overall management and would like a more inclusive role in decision-making about goals (Law et al., 2007). An Australian study found some discrepancy between clinicians' and people with aphasias' goals, and also found that clinicians were not always *aware* of their clients' goals (Rohde, Townley-O'Neill, Trendall, Worrall, & Cornwell, 2012). These studies highlight that although audit results do not reveal a particularly large gap for goal-setting in rehabilitation, both clinicians and clients perceive difficulties in this area and would like to see some change.

Similarly, in the area of conversation partner training, there is conflicting information between audit results and survey responses. Despite the national rehabilitation audit finding of 75% usage of supported conversation strategies with people with aphasia reported in the national rehabilitation audit (Stroke Foundation, 2016), Australian speech pathologists have reported low use and poor or very poor confidence with CPT approaches (Rose et al., 2013). Clinicians reported wanting to do more frequent, comprehensive CPT but found that barriers included limited time and resources, and limited family availability (Rose et al., 2013). Similar results were found in a Finnish survey, where 60% of respondents felt that they had too little time for instructing significant others, especially in the early phase of aphasia therapy (Klippi, Sellman, Heikkinen, & Laine, 2012). In addition to being important to clinicians, CPT is also an important area for families, with family members expressing a strong desire for conversation with people with aphasia (Brown, Worrall, Davidson, & Howe, 2012). In Sweden, for example, 52% of carers reported wanting to receive communication partner training (Blom Johansson, Carlsson, Östberg, & Sonnander, 2012).

It can be seen that including clinician and client perspectives of priorities for implementation targets may provide additional meaningful information to supplement evidence-practice gap data. Consideration of these factors may be helpful in identifying which areas of aphasia management could be successfully implemented, and should be targets for implementation efforts.

3.5.4 ***Barriers to Evidence Uptake in Aphasia Management***

There has been limited investigation into the barriers to the uptake of evidence and the provision of best practice in the field of aphasia. Although some research has shown that the most commonly reported barriers are similar to those identified in other areas of speech pathology practice, such as a lack of strong evidence, and insufficient time and resources, more research is needed to understand

the specific barriers facing speech pathologists providing aphasia management.

There is some emerging Australian research about speech pathologists' perceived barriers and facilitators to implementing stroke Clinical Practice Guideline recommendations. Interview (Miao, Power, & O'Halloran, 2014) and survey (Hadely, Power, & O'Halloran, 2014) studies found that speech pathologists reported barriers related to the work environment (e.g., staffing ratios), patient factors (e.g., stroke/aphasia severity), clinician factors (e.g., insufficient skills) and types of implementation strategies used (e.g., educational workshops or audit and feedback). In addition, of the 320 speech pathologists who responded to the survey, almost a third (31.9%) reported guideline limitations, such as impractical recommendations, a lack of high-level evidence, and insufficient or poor information, as barriers to their use of stroke CPGs (Hadely et al., 2014). Interestingly though, most respondents reported that stroke CPGs were either "somewhat useful" (63.3%) or "very useful" (34.4%) (Hadely et al., 2014). Although neither of these studies investigated barriers to meeting specific aphasia recommendations, they add to our understanding of speech pathologists' relationship with CPGs.

As addressed in the previous chapter, there are certain factors relating to a clinical guideline that may influence the level to which it is adhered. A guideline may be more likely to be followed depending on the setting (acute vs. other), complexity of decision-making required (simple vs. complex), quality of the evidence, compatibility with beliefs and values, and requirements for new skills (Grol & Grimshaw, 2003). It could be argued then, that implementing evidence-based aphasia guidelines would be particularly difficult, given the paucity of strong evidence, highly complex decision-making required, and the large changes required for both individuals and organisations. It has been generally recognised that due to insufficient 'Level 1/Class A' evidence, decisions regarding the management of patients with aphasia are based on lower levels of evidence (Dodd, 2007; Godecke et al., 2011).

Another issue facing speech pathologists is a lack of resources, including time and staffing limitations. For example, up to 50% of speech pathologists have reported they have insufficient time to conduct aphasia therapy (Klippi et al., 2012). Additionally, there is a lack of packaged evidence-based therapy resources, which adds to the time and complexity in preparing and delivering therapy (Power, Godecke, O'Halloran, & Worrall, 2012). Other environmental or organisational barriers include restrictive funding models, which can make it difficult to establish group therapy programs, and staffing limitations and a lack of quiet space to conduct therapy (Rose et al., 2013).

In addition to the above-mentioned barriers, which have also been described in other heath disciplines, there are some unique barriers that have been identified to evidence uptake in aphasia

practice. These include competing caseload demands, and the effect of a poor evidence-base on the attitudes and beliefs of clinicians.

The main aphasia-specific issue facing clinicians, particularly in the acute setting, is that of competing caseload demands. Specifically, priority is usually given to new dysphagia referrals over those requiring aphasia treatment. A UK study showed a significant increase in speech pathology referrals for dysphagia assessment and management between 1987 and 1995, and a subsequent reduction in treatment time for patient with aphasia (Enderby & Petheram, 2002). Although this data may be outdated, a more recent Australian survey confirmed that for the majority (89%) of respondents working in the acute setting, dysphagia dominated their caseload (Rose et al., 2013).

These conflicting caseload priorities have the potential to cause job dissatisfaction, with some researchers arguing that there is professional discord between desired service delivery and actual practice (Byng, 2002). Greener and Grant (1998) suggested that speech pathologists' morale was low, and that they, "*…feel the service they provide to people with aphasia is adversely affected by the increasing demands made on the service by those with dysphagia*," (p. 2). When asked about the challenges in providing an aphasia service, one speech pathologist recently reported, "*I feel we could be doing much more at the acute level*" (Rose et al., 2013).

The often-limited time that acute clinicians allocate to the assessment and management of aphasia service may also have flow-on effects on skill level and confidence with providing aphasia therapy. Some clinicians now believe that, while once the standard caseload for speech pathologists working with adults, aphasia management requires specialist skills (Power et al., 2012).

One issue that has received little attention in the literature is the effect of the attitudes and beliefs of speech pathologists on implementation of evidence-based recommendations. When considering the barriers to, and facilitators for, implementing evidence-based healthcare, the thoughts, views, perspectives and experiences of individuals concerned directly with those interventions are important. There is some evidence that clinicians hold complex and often emotionally conflicted views about provision of aphasia services, including issues surrounding the emotional drain of providing therapy and counselling (Rose et al., 2013), and in some cases, a sense of disempowerment in their ability to provide acute aphasia management (Foster, Worrall, Rose, & O' Halloran, 2015). There is limited understanding, however, on how these challenges impact speech pathologists' implementation of aphasia guideline recommended practices. These issues need to be explored further in relation to specific aphasia guideline recommendations, as factors influencing guideline adherence can vary depending on the practice being recommended (Lugtenberg, Zegers-van Schaick, Westert, & Burgers, 2009). The clinical setting in which the

speech pathologist works may be especially important, with suggestions that implementing aphasia-related practices are more difficult in the acute setting (Simmons-Mackie et al., 2007).

There has been considerable debate on the role of spontaneous recovery in post-stroke aphasia, and, until recently, limited evidence from systematic reviews that aphasia therapy is effective. It is unclear how this debate has impacted on speech pathologists' attitudes and beliefs towards therapy, and if it has affected their agreement with, and adherence to, guideline recommendations. Greener and Grant (1998) identified that the majority of speech pathologists in their study were not convinced of the effectiveness of treatments offered to people with aphasia, but this issue has not been re-addressed in any known subsequent studies. Similarly, well-respected aphasia expects have advocated an informal assessment approach in the acute stages of aphasia management, due to the role of spontaneous recovery (Holland & Fridriksson, 2001). Indeed, the 1999 Cochrane review regarding the effectiveness of aphasia therapy, which included 12 studies, was inconclusive (Greener, Enderby, & Whurr, 1999). While the three most recent updates of this review support the effectiveness of aphasia therapy (Brady, Godwin, Enderby, Kelly, & Campbell, 2016; Brady, Kelly, Godwin, & Enderby, 2012; Kelly, Brady, & Enderby, 2010), it is possible that not all clinicians' beliefs have changed with the new evidence. For example, some have argued that traditional structured assessment and management of aphasia is neither feasible nor appropriate in the acute stages (Duffy, Fossett, & Thomas, 2010). Given these long-held views of many researchers, it is possible that some clinicians may not agree with recommendations regarding timing and intensity of therapy in the acute setting, due to a disbelief that it will be effective. These beliefs need to be investigated further.

3.6 Summary and Conclusions

Implementation is an important healthcare research area that is in its infancy in the field of post-stroke aphasia. Increased implementation efforts in aphasia are needed, as there are numerous evidence-practice gaps that need to be addressed in order to improve patient outcomes. The literature reviewed in this chapter has identified a number of unanswered questions when considering implementation in the field of aphasia. Which areas of aphasia management have the largest evidence-practice gaps and what are the priorities for implementation in aphasia? What are speech pathologists' beliefs and attitudes towards aphasia management and what factors impact on these? How do the challenges associated with adhering to aphasia guideline recommendations impact on speech pathologists and their implementation efforts? And finally, what implementation interventions may be effective in addressing the barriers to aphasia management practices?

As strong evidence from other healthcare professions shows, tailoring behaviour change

interventions to known barriers and facilitators results in more effective implementation (Baker et al., 2010, Baker et al., 2015). As such, it is imperative that the barriers and facilitators to evidence uptake in aphasia rehabilitation are thoroughly investigated in the Australian context. Until there is greater understanding of these barriers and facilitators, any strategies to improve implementation may potentially be wasted. It is anticipated that, by having this understanding of the factors influencing evidence uptake in aphasia practice, effective behaviour change interventions will be able to be developed that will result in reduced evidence-practice gaps and improved healthcare outcomes for people with aphasia.

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Chapter 4: Recommendations for Post-Stroke Aphasia Rehabilitation: An Updated Systematic Review and Evaluation of Clinical Practice Guidelines.

As described in Chapter 1, there is evidence that implementation of stroke guideline recommendations improves processes of care and patient outcomes. However, the clinical practice guidelines available to guide speech pathologists' management of post-stroke aphasia are of varying methodological quality, and may contain many recommendations within them. Before embarking on implementation efforts, it is first necessary to identify which guideline recommended practices are relevant to speech pathologists and need to be implemented. Therefore, Chapter 4 aimed to extract and synthesise recommendations with the highest levels of evidence from high quality aphasia clinical practice guidelines.

The content of this chapter has been published in the peer-reviewed journal, *Aphasiology*: Shrubsole, Worrall, Power & O'Connor (2016). Recommendations for post-stroke aphasia rehabilitation: An updated systematic review and evaluation of clinical practice guidelines. *Aphasiology*; 1-24. doi:10.1080/02687038.2016.1143083.

The content included in this chapter is identical to the submitted manuscript; however, the formatting has been modified to match the style of this thesis.

4.1 Abstract

Background: Clinical Practice Guidelines (CPGs) have been shown to improve patient care and outcomes. For speech pathologists working with people with post-stroke aphasia, there is currently no single high quality guideline that summarises all of the available research knowledge into recommendations to guide decision-making. While multiple stroke and aphasia guidelines exist, some are of low methodological quality, are out of date or do not provide recommendations that specifically guide aphasia management. As such, it may be difficult for clinicians to choose one particular guideline to follow.

Aim: To identify, extract and evaluate recommendations from high quality clinical practice guidelines to inform the management of post-stroke aphasia by speech pathologists.

Methods & Procedures: An updated systematic review of stroke and speech pathology-specific clinical guidelines was conducted in January, 2015. The search included multiple databases (MEDLINE, Embase, CINAHL), guideline and stroke websites, and other sources. The quality of included guidelines was assessed using the Appraisal of Guidelines and Research and Evaluation (AGREE) II tool. Guidelines that obtained a high AGREE II 'Rigour of Development' score were retained and the aphasia-relevant recommendations from these guidelines were extracted for further analysis. Recommendations were evaluated according to their applicability to aphasia and the clarity of linkages between the recommendations and underlying evidence.

Outcomes & Results: Five new guidelines were identified. Their AGREE II ratings ranged from 31.3 – 71.9, and one met the cut-off of 66.67 for further analysis. 111 recommendations from four guidelines were extracted and evaluated. From these, 76 recommendations met the inclusion criteria, 25 of which were specifically targeted at aphasia management, the remainder being general rehabilitation principles that may apply to aphasia. Thirty-four recommendations were directly linked to evidence, and 42 were based on consensus. Research gaps were noted for goal-setting, counselling, patient and carer support, and discharge planning, indicating possible areas for future research. There were challenges in comparing recommendations from different CPGs, determining whether evidence was applicable to people with aphasia, and in identifying clear links between the evidence and some recommendations.

Conclusions: The collated 76 (34 evidence-based, 42 consensus-based) recommendations can be used by speech pathologists to guide aphasia rehabilitation. Aphasia-specific research is required in areas such as goal-setting, counselling, patient and carer support, and discharge planning.

Keywords: aphasia, stroke, clinical practice guidelines, systematic review, recommendations.

4.2 Introduction

Aphasia is one of the most common consequences of stroke, occurring in up to 38% of stroke survivors (Berthier, 2005). It is associated with increased mortality and reduced rates of functional recovery, and can have a substantial negative impact on psychological well-being and quality of life (Cruice, Worrall, Hickson, & Murison, 2003; Engelter et al., 2006). While it has been estimated that approximately 40% of acutely aphasic patients experience complete or almost complete recovery by one-year post stroke, the majority of people with aphasia have long-lasting residual difficulties (Ferro, Mariano, & Madureira, 1999; Kertesz & McCabe, 1977). Research has shown that speech therapy is beneficial over spontaneous recovery; treated individuals have almost twice the degree of recovery of untreated individuals when therapy is commenced within the first 3-months post-stroke (Brady, Kelly, Godwin, & Enderby, 2012; Robey, 1998).

In order to provide the most effective treatments and achieve the best patient outcomes, it is essential that speech pathologists use evidence to guide their practice. Evidence-based Clinical Practice Guidelines (CPGs) summarise knowledge from clinical research and provide 'systematically developed statements to assist practitioner decisions about appropriate health care for specific clinical circumstances' (Field & Lohr, 1990, p. 38). They aim to standardise processes of care with the overarching aim of improving patient outcomes (Eccles, Grimshaw, Shekelle, Schünemann, & Woolf, 2012; Straus, Tetroe, & Graham, 2009). In stroke, CPGs have been shown to be effective in changing both the processes and outcomes of care (Thomas et al., 1999), and are associated with better post-stroke recovery outcomes (Hubbard et al., 2012). However, there is a lack of clear guidance from CPGs for speech pathologists providing post-stroke aphasia management.

Although there are several CPGs relevant to stroke and aphasia, not all CPGs have been developed to the same methodological standard, and therefore have varying quality (Grilli, Magrini, Penna, Mura, & Liberati, 2000). CPG developers may use different processes for formulating the recommendations, different search strategies, methods for grading the recommendations, and ways of presenting the evidence (Scott & Guyatt, 2011). An analysis of ischemic stroke CPGs found that the majority (77.8%) of guidelines were of low methodological quality, receiving an overall score of "would not recommend" on the Appraisal of Guidelines Research & Evaluation (AGREE) instrument (Navarro Puerto et al., 2008). In stroke rehabilitation, there was also considerable variability in guideline quality,

but they scored higher on the AGREE rigour of development domain than CPGs from other medical fields (Hurdowar et al., 2007).

Similar variability has been found in CPGs relevant to aphasia management. Rohde and colleagues (2013) evaluated the quality of 19 CPGs relating to aphasia and stroke, finding substantial variation in the rigour of guideline development processes, and variable levels of coverage for aphasia management. For example, the Scottish Intercollegiate Guidelines Network SIGN 108: *Management of Patients with Stroke or TIA* (2008), a CPG assessed as having used rigorous methods of development, did not have any specific aphasia recommendations. Conversely, the guideline with the most comprehensive aphasia coverage, the Royal College of Speech and Language Therapists (RCSLT) Clinical Guidelines (2005), had a lower quality guideline development score. Although the Rohde review is useful in guiding clinicians to the highest quality clinical guidelines, it does not examine individual recommendations in detail.

To our knowledge, there is no single guideline to inform post-stroke aphasia management. Guidelines may have low quality methodological rigour, be out of date or have no specific aphasia recommendations. In addition, unclear recommendations and a poor evidence base limit their perceived usefulness. In a survey of 320 Australian speech pathologists, almost one third of respondents reported that limitations associated with the stroke guidelines themselves were barriers to their use (e.g., a lack of high-level evidence, and insufficient or poor information to guide practice) (Hadely, Power, & O'Halloran, 2014). Also, it is not always clear if the underlying studies that inform the recommendations included people with aphasia and whether they can be applied to that population. In a Cochrane review of the evidence relating to information provision after stroke (Smith et al., 2008), only one of the included 14 randomised controlled trials included people with aphasia with the remainder either excluding this group (10/14 trials) or failing to report any exclusion criteria (Brady, Fredrick, & Williams, 2013).

In summary, it may be difficult for clinicians to choose one particular guideline to follow. Additionally, there is no synthesis of recommendations from varied sources so it may be difficult for clinicians to identify which recommendations from which guidelines should take priority. Prioritisation of recommendations may be necessary, as time constraints (Klippi, Sellman, Heikkinen, & Laine, 2012) and competing caseloads (Rose, Ferguson, Power, Togher, & Worrall, 2013) often challenge speech pathologists in their efforts to

provide aphasia rehabilitation. While the Rohde review examined the quality of relevant CPGs, it did not extract and evaluate the content of individual recommendations from the included guidelines. Therefore, the aims of the present study are

1. to update the systematic search of Rohde and colleagues (2013), in order to identify CPGs relevant to post-stroke aphasia management published since April 2012 and to assess their quality;
2. to extract and categorise the recommendations from high quality CPGs according to area of practice (e.g., assessment, treatment); and
3. to evaluate the recommendations according to the applicability of the underlying evidence to speech pathology practice, and whether the recommendation can be clearly linked to the underlying evidence.

4.3 Methodology

4.3.1 *Design*

Updated systematic review and descriptive analysis.

4.3.2 *Identification of Current CPGs*

Search strategy.

To identify all current stroke CPGs related to stroke and aphasia, we used the findings of the existing review by Rohde and colleagues (2013), in which the search for CPGs was last conducted in April 2012. We repeated their search to locate any CPGs that had been published since that time. The updated search included multiple electronic databases (MEDLINE, Embase, CINAHL), Google Scholar, guideline and stroke websites (e.g., Scottish Intercollegiate Guidelines Network - www.sign.ac.uk/guidelines), guideline databases (e.g. National Guideline Clearinghouse - www.guidelines.gov), and bibliographies of relevant articles. Search terms included population (stroke OR cardiovascular OR aphasia OR dysphasia) and publication type (guideline OR recommendation OR clinical practice guideline). The search mode used was Boolean/Phrase, and limits were set for documents published from April 1, 2012 until the search date of January 13, 2015. A sample search strategy for CINAHL is shown in Figure 4-1, and detailed search information can be found in Appendix A.

1. aphasia
2. dysphasia
3. 1 or 2
4. stroke
5. cardiovascular
6. 4 or 5
7. (guideline/-s/-*)
8. (standard/-s/-*)
9. (practice guideline/-s/-*)
10. (recommendations/-s/-*)
11. 7 or 8 or 9 or 10
12. 3 or 6
13. 11 and 12

The terms 'guideline', 'practice guideline', 'recommendations' and 'standard' were entered with the truncation '*', and as singular and plural terms (/-s/)

Figure 4-1. Search Strategy: CINAHL

Inclusion criteria.

CPGs were included if their scope related to the management of stroke rehabilitation or aphasia in adults and were available in English. Documents were included if they contained recommendations with a multidisciplinary focus within the guideline (i.e. not limited to medical management) or were speech therapy-specific (i.e. included guidance on the assessments or treatments that speech therapists typically provide). As per the criteria used by Rohde and colleagues (2013), CPGs relating to sub-arachnoid haemorrhage or stroke prevention were excluded.

Data Collection and Screening.

The primary author conducted the search and screened and selected guidelines. Once CPGs were identified, the evidence tables and search strategies underpinning each guideline were sought and, if required, authors were contacted for further information.

4.3.3 *Evaluation of Guideline Quality*

The quality of the newly identified CPGs was evaluated using the Rigour of Development (Domain 3) score of the AGREE II instrument (Brouwers et al., 2010). The AGREE II tool is a reliable and valid update of the original AGREE tool (Brouwers et al., 2010) which was created as a generic instrument to assess the methods used and the quality of reporting in guideline development (AGREE Next Steps Consortium, 2009). Each item of the instrument is ranked on a 7-point Likert scale with 1 indicating 'Strongly Disagree' and 7 indicating 'Strongly Agree', with an accompanying user manual to assist the rating process (AGREE Next Steps Consortium, 2009).

The Rigour of Development (Domain 3) score of the AGREE II instrument consists of eight items, listed in Table 4-1. This domain appraises the processes used to gather and synthesise the evidence and the methods used to formulate and update the recommendations (AGREE Next Steps Consortium, 2009; Hurdowar et al., 2007). The Rigour of Development domain was selected as it is considered most indicative of guideline quality (Hurdowar et al., 2007), and scores from this domain have been used in previous studies for this purpose (Adelaide Health Technology Assessment, 2008; Rohde et al., 2013). Two individuals experienced in the field of aphasia management independently evaluated the CPGs and scored the Rigour of Development domain. Following evaluation, any discrepancies in scoring between the two evaluators were discussed and resolved through consensus, so that discrepancies were no more than one point for any given item. This method of seeking consensus was conducted in keeping with previous systematic reviews (Adelaide Health Technology Assessment, 2008; Rohde et al., 2013) to ensure that evaluators considered the same information, and to minimise the chances of discrepancies occurring as a result of information in the extensive methodology manuals being overlooked.

The AGREE II consortium does not set recommendations of scores to differentiate between high and poor quality guidelines, instead suggesting that these decisions are made by the user in the specific context (AGREE Next Steps Consortium, 2009). As per Rohde and colleagues (2013), the cut-off for inclusion in further analysis of the CPGs was 66.67 on the AGREE II Rigour of Development domain, as it included CPGs with scores within the top third of the 7-point Likert scale. In the previous study by Rohde and colleagues (2013), three guidelines scored above 66.67 on this domain: the *Australian Clinical Guidelines for Stroke Management* (AustCGSM) (National Stroke Foundation, 2010), the *New Zealand Clinical Guidelines for Stroke Management* (NZCGSM) (Stroke Foundation of New Zealand and New Zealand Guidelines Group, 2010) and the *Scottish Intercollegiate Guidelines Network* (SIGN) *108: Management of Patients with Stroke or TIA* (2008). All of the CPGs that met the cut-off score, including any identified in the present study and the three CPGs identified in the Rohde and colleagues (2013) review, were then further evaluated (see below).

Table 4-1. Domain 3: Rigour of Development Items of AGREE II

Number	Item
7	Systematic methods were used to search for evidence.
8	The criteria for selecting the evidence are clearly described.
9	The strengths and limitations of the body of evidence are clearly described.
10	The methods for formulating the recommendations are clearly described.
11	The health benefits, side effects, and risks have been considered in formulating the recommendations.
12	There is an explicit link between the recommendations and the supporting evidence.
13	The guideline has been externally reviewed by experts prior to its publication.
14	A procedure for updating the guideline is provided.

Note: Each item is scored based on a Likert scale of 1 (Strongly Disagree) to 7 (Strongly Agree). Refer to AGREE II manual for full details.

4.3.4 *Evaluation of Aphasia-Related Recommendations*

All recommendations relating to stroke rehabilitation and aphasia were extracted from the selected guidelines and critically evaluated. Extracted recommendations were collated and categorised according to clinical topic areas (e.g., assessment, treatment). Next, any recommendations with similar content originating from different CPGs were compared and, where judged as the same or very similar, combined as a single recommendation. To identify recommendations with the strongest evidence, recommendations were ranked according to their assigned evidence grade. Recommendations that were linked to expert opinion or a consensus-based process (e.g., Good Practice Point or Consensus Statement) were separated from the evidence-based recommendations and were not analysed further but are contained in the Supplementary Table 2 (online). The extraction and evaluation of guideline recommendations were undertaken by the primary author and discussed with the other authors to achieve consensus in decision-making.

Recommendations were classified as either *aphasia-specific* or *aphasia-related* for this study. For the aphasia-specific recommendations, these clearly pertained directly to aphasia management (such as language assessment or therapy techniques). General rehabilitation recommendations were labelled *aphasia-related* based on their relevance to speech pathology and aphasia management. The research team developed criteria for the inclusion of aphasia-related recommendations: (i) the underlying studies included participants with aphasia in the sample of stroke patients, or, (ii) if people with aphasia were excluded from the underlying studies, the results were relevant to speech pathologists and could be reasonably applied to aphasia management. For example, if the study examined the effects of a physiotherapy technique on patient outcomes, then the related recommendation would be removed as the treatment is not within a speech pathologist's scope of practice. If the study referred to providing information and support to patients with stroke then the findings would be considered relevant to speech pathology practice even if the study did not include people with aphasia.

Finally, the references cited for each recommendation were retrieved and reviewed to determine whether findings were congruent with the individual recommendations. Any recommendations that could not be clearly linked with the underlying evidence were excluded.

4.4 Results

4.4.1 *Identification of Current CPGs*

The guideline selection process is summarised in the flow chart in Figure 4-2, along with the results of the evaluation of recommendations. A total of 2892 new documents from April 2012 were identified for screening, and 78 were retrieved for full-text analysis. Of these, 73 documents were excluded, and the remaining five were analysed using the AGREE II instrument.

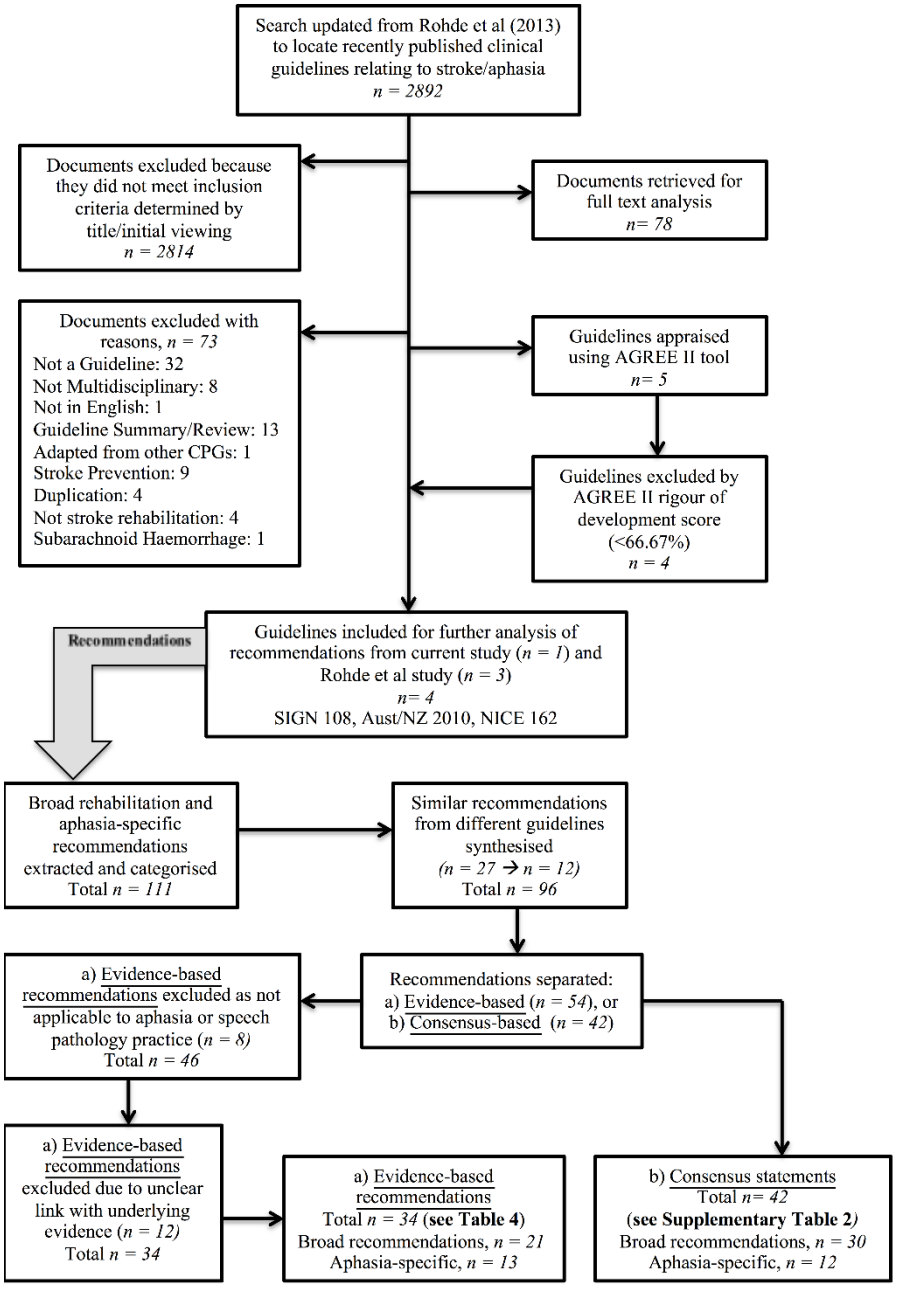

Figure 4-2. Selection Process for the Included Clinical Practice Guidelines and Recommendations

4.4.2 *Evaluation of Guideline Quality*

The CPGs appraised using the AGREE II tool and their Rigour of Development scores are presented in Table 4-2. One of the newly identified CPGs scored above 66.67 on the Rigor of Development domain: the *National Institute for Health and Care Excellence (NICE) Clinical Guideline 162: Stroke rehabilitation, long-term rehabilitation after stroke* (National Institute for Health and Care Excellence, 2013b). As stated previously, the three guidelines that met the cut-off in the study by Rohde and colleagues (2013) were: AustCGSM (National Stroke Foundation, 2010), NZCGSM (Stroke Foundation of New Zealand and New Zealand Guidelines Group, 2010) and SIGN *108* (2008). Therefore, these four guidelines were included for further analysis of the recommendations. Details of the scope of each guideline is summarised in Table 4-3. As the NZCGSM was adapted from the AustCGSM and the recommendations pertaining to aphasia management are identical in both guidelines, the Australian and New Zealand guidelines were analysed as a single guideline (Aust/NZCGSM).

4.4.3 *Evaluation of Relevant Recommendations*

A total of 111 recommendations relevant to stroke rehabilitation and aphasia were extracted from the four high quality CPGs, which were then categorised according to topic. From this list, 27 recommendations originating from the different CPGs were judged as being very similar and were synthesised into 12 recommendations. Forty-two consensus-based recommendations were identified and separated (see Supplementary Table 2). After examining the underlying evidence, a further eight recommendations were removed as they were deemed not aphasia-related or aphasia-specific (e.g., if they related to interventions given by nursing staff or other health professionals). Additionally, it was determined that the link between the evidence and the recommendation was unclear for 12 recommendations, and these were also excluded. Refer to Supplementary Table 1 (online) for a full list of all 111 recommendations and the reasons for exclusion where appropriate.

Overall, 76 recommendations remained; 34 (44.7%) of these were directly linked to evidence, and 42 (55.3%) were linked to consensus. The evidence-based recommendations are shown in Table 4-4. The evidence-based recommendations covered nine topic areas: screening assessment; goal-setting; treatment amount, timing and intensity; carer training; treatment approaches; information, education and aphasia-friendly information; counselling; support for clients and carers; and return to work.

Table 4-2. AGREE II Ratings

		Domain 3: Rigour of Development (RoD) Items of AGREE II									
Clinical Practice Guideline	Rater	Systematic search methods	Clearly described selection criteria	Strengths and limitations described	Methods for formulating recommendations described	Health benefits, side effects, risks considered	Explicit links between recommendations and evidence	External review	Procedure for update provided	Total	AGREE II RoD Score
Royal College of Physicians 4th Ed. National Clinical Guideline for Stroke (2012)	Rater 1	6	3	5	3	6	5	3	5	36	
	Rater 2	7	3	4	3	6	4	2	5	33	**55.2**
Institute for Clinical Systems Improvement (ICSI) Diagnosis and Treatment of Ischemic Stroke (2012)	Rater 1	5	4	4	3	5	5	4	5	35	
	Rater 2	6	5	3	2	5	6	4	6	37	**58.3**

Guidelines for the Early Management of Patients With Acute Ischemic Stroke: A Guideline for Healthcare Professionals From the American Heart Association/ American Stroke Association (2013)	Rater 1	2	2	6	3	5	4	2	2	26	
	Rater 2	2	1	5	2	5	3	1	1	20	**31.3**
National Institute for Health and Care Excellence (NICE) Clinical Guideline 162: Stroke Rehabilitation – Long-term rehabilitation after Stroke (2013)	Rater 1	7	7	6	7	5	3	5	2	42	
	Rater 2	6	7	6	7	5	3	4	2	43	**71.9**
Canadian Best Practice Recommendations for Stroke Care: Chapter 5 – Stroke Rehabilitation (2013)	Rater 1	5	5	4	3	3	7	4	7	38	
	Rater 2	5	6	4	2	3	7	4	7	38	**62.5**

Table 4-3. Overview of Included Guidelines

Clinical Practice Guideline	Scope
National Institute for Health and Care Excellence (NICE) Clinical Guideline 162: Stroke Rehabilitation – Long-term Rehabilitation after Stroke (2013)	• Rehabilitation for continuing impairment (2 or more weeks post stroke) • Organisation of services • Community participation and long-term recovery
Australian Clinical Guidelines for Stroke Management (AustCGSM) (2010)	• Organisation of services • Stroke recognition and pre-hospital care • Secondary prevention • Rehabilitation • Managing complications • Community participation and long-term recovery • Cost and socioeconomic implications
New Zealand Clinical Guidelines for Stroke Management (NZCGSM) (2010)	• This is the Australian guideline plus a section specific to New Zealand issues
Scottish Intercollegiate Guidelines Network (SIGN) *108: Management of Patients with Stroke or TIA* (2008)	• Assessment • Investigation • Immediate management • Secondary prevention

Table 4-4. Recommendations for Post-Stroke Aphasia Management from High Quality CPGs

Topic Area		Recommendations	Guidelines	Citations	Strength of Evidence/ Grade	Comment	Aphasia-Specific?
Screening Assessment	1	All patients should be screened for communication deficits using a screening tool that is valid and reliable.	Aust/NZ CGSM	Salter et al, 2006.	C		Yes
Goal-Setting	2	Health professionals should collaboratively set goals for patient care. Goals should be prescribed, specific and challenging. They should be recorded, reviewed and updated regularly.	Aust/NZ CGSM	Playford et al, 2009.	C	Synthesised	No, broad
		Ensure that people with stroke have goals for their rehabilitation that: • are meaningful and relevant to them • focus on activity and participation • are challenging but achievable • include both short-term and long-term elements.	NICE 162	Linked to evidence from systematic r/v of 23 studies (qualitative, quantitative and mixed methods)	Strong		
	3	The stroke team should meet regularly with the patient and their family/carer to involve them in management, goal setting and planning for discharge.	Aust/NZ CGSM	Langhorne & Pollock, 2002.	C	Synthesised	No, broad
		Ensure that goal-setting meetings during stroke rehabilitation involve the person with stroke and, where appropriate, their family or carer in the discussion.	NICE 162	Linked to evidence from systematic r/v of 23 studies	Strong		
	4	The multidisciplinary stroke team should meet regularly (at least weekly) to discuss assessment of new patients, review patient management and goals, and plan for discharge.	Aust/NZ CGSM	Langhorne & Pollock, 2002.	C	Synthesised	No, broad

		Ensure that goal-setting meetings during stroke rehabilitation are timetabled into the working week.	NICE 162	Linked to evidence from systematic r/v of 23 studies	Strong		
Treatment – Amount, Timing and Intensity	5	Offer initially at least 45 minutes of each relevant stroke rehabilitation therapy for a minimum of 5 days per week to people who have the ability to participate, and where functional goals can be achieved. If more rehabilitation is needed at a later stage, tailor the intensity to the person's needs at that time.	NICE 162	Linked to evidence from systematic r/v of 4 RCTs	Strong		No, broad
	6	Consider more than 45 minutes of each relevant stroke rehabilitation therapy 5 days per week for people who have the ability to participate and continue to make functional gains, and where functional goals can be achieved.	NICE 162	Linked to evidence from systematic r/v of 4 RCTs	Weak*		No, broad
	7	If people with stroke are unable to participate in 45 minutes of each rehabilitation therapy, ensure that therapy is still offered 5 days per week for a shorter time at an intensity that allows them to actively participate.	NICE 162	Linked to evidence from systematic r/v of 4 RCTs	Strong		No, broad
	8	Treatment for aphasia should be offered as early as tolerated.	Aust/NZ CGSM	Godecke, 2009.	B		Yes
	9	As much therapy for communication difficulties should be provided as can be tolerated.	Aust/NZ CGSM	Bhogal et al, 2003; Bakheit et al, 2007; Godecke, 2009.	C		Yes
Family and CPT	10	Caregivers should be offered ongoing practical information and training individualised for the needs of the person for whom they are caring	SIGN 108	Visser-Meily, 2005. Kalra et al, 2004.	A	Synthesised	No, broad

		Relevant members of the multidisciplinary team should provide specific and tailored training for carers/family before the stroke survivor is discharged home. This should include training, as necessary, in personal care techniques, communication strategies, physical handling techniques, ongoing prevention and other specific stroke-related problems, safe swallowing and appropriate dietary modifications, and management of behaviours and psychosocial issues.	Aust/NZ CGSM	Kalra et al, 2004.	B		
	11	For individuals with aphasia, intervention can include supported conversation techniques.	Aust/NZ CGSM	Wertz et al, 1986; Kagan et al, 2001.	C	Synthesised	Yes
		Offer training in communication skills (such as slowing down, not interrupting, using communication props, gestures, drawing) to the conversation partners of people with aphasia after stroke.	NICE 162	Linked to evidence from 2 RCTs	Strong		
Therapy Approaches	12	For individuals with aphasia, intervention can include treatment of aspects of language based on models derived from cognitive neuropsychology.	Aust/NZ CGSM	Doesborgh et al, 2004.	C	Synthesised	Yes
		Speech and language therapists should provide direct impairment-based therapy for communication impairments (for example, aphasia or dysarthria).	NICE 162	Linked to evidence from 8 RCTs	Strong		
	13	For individuals with aphasia, intervention can include constraint-induced language therapy.	Aust/NZ CGSM	Cherney et al, 2008.	B	Synthesised	Yes
		Speech and language therapists should help the person with stroke to use and enhance their remaining language and communication abilities.	NICE 162	Linked to evidence from 8 RCTs	Strong		
	14	For individuals with aphasia, intervention can include the use of	Aust/NZ	Rose et al, 2002.	D	Synthesised	Yes

	gesture.	CGSM				
	Speech and language therapists should teach other methods of communicating, such as gestures, writing and using communication props.	NICE 162	Linked to evidence from 8 RCTs	Strong		
15	For individuals with aphasia, intervention can include supported conversation techniques.	Aust/NZ CGSM	Wertz et al, 1986; Kagan et al, 2001.	C	Synthesised	Yes
	Speech and language therapists should coach people around the person with stroke (including family members, carers and health and social care staff) to develop supportive communication skills to maximise the person's communication potential.	NICE 162	Linked to evidence from 8 RCTs	Strong		
16	For individuals with aphasia, intervention can include delivery of therapy programs via computer.	Aust/NZ CGSM	Katz & Wertz, 1997.	C		Yes
17	Group therapy and conversation groups can be used for people with aphasia and should be available in the longer term for those with chronic and persisting aphasia.	Aust/NZ CGSM	Elman et al, 1999.	C	Synthesised	Yes
	Tell the person with communication difficulties after stroke about community- based communication and support groups (such as those provided by the voluntary sector) and encourage them to participate.	NICE 162	Linked to evidence from 14 RCTs	Strong		
18	Speech and language therapy for people with stroke should be led and supervised by a specialist speech and language therapist working collaboratively with other appropriately trained people – for example, speech and language therapy assistants, carers and friends, and members of the voluntary sector.	NICE 162	Linked to evidence from 14 RCTs	Strong		Yes

	19	Provide opportunities for people with communication difficulties after stroke to have conversation and social enrichment with people who have the training, knowledge, skills and behaviours to support communication. This should be in addition to the opportunities provided by families, carers and friends.	NICE 162	Linked to evidence from 14 RCTs	Strong		Yes
Information, Education and Aphasia-Friendly Information	20	All stroke survivors and their families/carers should be offered information tailored to meet their needs using relevant language and communication formats.	Aust/NZ CGSM	Smith et al, 2008.	A	Synthesised	No, broad
		Healthcare professionals should take a patient's age, gender, educational status and communication support needs into account when assessing their need for information.	SIGN 108	van der Smagt-Duijnstee et al, 2001; Choi-Kwon et al, 2005.	D		
		Working with the person with stroke and their family or carer, identify their information needs and how to deliver them, taking into account specific impairments such as aphasia and cognitive impairments. Pace the information to the person's emotional adjustment.	NICE 162	Linked to evidence from systematic r/v of 5 RCTs	Strong		
	21	Information should be provided at different stages in the recovery process.	Aust/NZ CGSM	Smith et al, 2008.	B	Synthesised	No, broad
		Information should be tailored to the phase of the patient's journey.	SIGN 108	Hoffmann et al, 2004.	D		
	22	Information should be offered in a variety of formats including easy access.	SIGN 108	Forster et al, 2005.	A		No, broad
	23	Stroke survivors should be provided with routine, follow-up opportunities for clarification or reinforcement of the information provided.	Aust/NZ CGSM	Smith et al, 2008.	B	Synthesised	No, broad

		Information should be repeated and re-offered at appropriate intervals.	SIGN 108	Hoffmann et al, 2004; Wachters-Kaufmann et al, 2005.	D	
		Review information needs at the person's 6-month and annual stroke reviews and at the start and completion of any intervention period.	NICE 162	Linked to evidence from systematic r/v of 5 RCTs	Strong	
	24	Each patient should be assessed on his or her readiness to receive information.	SIGN 108	van der Smagt-Duijnstee et al, 2001; Choi-Kwon et al, 2005.	D	No, broad
	25	In patients with aphasia, all written information on health, aphasia, social and community supports should be available in an aphasia-friendly format.	Aust/NZ CGSM	Brennan et al, 2005; Rose et al, 2003.	D	Yes
Counselling	26	Counselling can include an active educational counselling approach.	Aust/NZ CGSM	Bhogal et al, 2003.	B	No, broad
	27	Counselling can include information supplemented by family counselling.	Aust/NZ CGSM	Clark et al, 2003.	C	No, broad
	28	Counselling can include a problem-solving counselling approach.	Aust/NZ CGSM	Evans et al, 1988.	C	No, broad

Support – Clients and Carers

29	Carers should be provided with tailored information and support during all stages of the recovery process. This includes (but is not limited to) information provision and opportunities to talk with relevant health professionals about the stroke, stroke team members and their roles, test or assessment results, intervention plans, discharge planning, community services and appropriate contact details.	Aust/NZ CGSM	Smith et al, 2008; Brereton et al, 2007.	C		No, broad
30	Carers should be provided with information about the availability and potential benefits of local stroke support groups and services, at or before the person's return to the community.	Aust/NZ CGSM	Brereton et al, 2007; Lee et al, 2007; Eldred & Sykes, 2008; Visser-Meily et al, 2005.	C	Synthesised	No, broad
	Provide information about local resources (for example, leisure, housing, social services and the voluntary sector) that can help to support the needs and priorities of the person with stroke and their family or carer.	NICE 162	Linked to evidence from systematic r/v of 5 RCTs	Strong		
31	Carers should be offered support services after the person's return to the community. Such services can use a problem-solving or educational-counselling approach.	Aust/NZ CGSM	Bhogal et al, 2003; Lee et al, 2007; Lui et al, 2005.	C		No, broad
32	Healthcare professionals should actively involve carers and find out what support they need.	SIGN 108	van der Smagt-Duijnstee et al, 2001; Brereton & Nolan, 2000.	D		No, broad
33	Carers' support needs should be addressed prior to patient discharge.	SIGN 108	Brereton & Nolan, 2000; Brereton & Nolan, 2002.	D		No, broad

Return to Work	34	Return-to-work issues should be identified as soon as possible after the person's stroke, reviewed regularly and managed actively. Active management should include: • identifying the physical, cognitive, communication and psychological demands of the job (for example, multi-tasking by answering emails and telephone calls in a busy office) • identifying any impairments on work performance (for example, physical limitations, anxiety, fatigue preventing attendance for a full day at work, cognitive impairments preventing multi-tasking, and communication deficits) • tailoring an intervention (for example, teaching strategies to support multi-tasking or memory difficulties, teaching the use of voice-activated software for people with difficulty typing, and delivery of work simulations) • educating about the Equality Act 2010 and support available (for example, an access to work scheme) • workplace visits and liaison with employers to establish reasonable accommodations, such as provision of equipment and graded return to work	NICE 162	Evidence linked to systematic r/v of 1 RCT	Strong	No, broad

Note. Grade A = "Body of evidence can be trusted to guide practice", Grade B = "Body of evidence can be trusted to guide practice in most situations", Grade C = "Body of evidence provides some support for recommendation(s) but care should be taken in its application", Grade D = "Body of evidence is weak and recommendation must be applied with caution" (National Health and Medical Research Council, 2009). Grade A = "At least one meta-analysis, systematic review, or RCT rated as 1++, and directly applicable to the target population; or A body of evidence consisting principally of studies rated as 1+ , directly applicable to the target population, and demonstrating overall consistency of results", Grade D = "Evidence level 3 or 4; or Extrapolated evidence from studies rated as 2+" (Scottish Intercollegiate Guidelines Network, 2008). Strong = clear evidence of benefit, Weak* = evidence of benefit is less certain (National Institute for Health and Care Excellence, 2013b). * 'Weak' is used to reflect the NICE 162's definition of recommendations to 'consider using'. *Refer to Supplementary Table 1 (online) for a full list of all 111 recommendations and the reasons for exclusion where appropriate.*

Of the 76 recommendations, 51 (21 evidence-based, 30 consensus-based) were related to broad rehabilitation principles (aphasia-related recommendations), and 25 (13 evidence-based, 12 consensus-based) were aphasia-specific recommendations.

For an analysis of the breakdown of recommendations according to the strength of the evidence and whether they were aphasia-specific, refer to Table 4-5. An analysis of the evidence-based recommendations per topic area and specificity to aphasia is shown in Table 4-6. Of note, there were no aphasia-specific recommendations identified for goal-setting, counselling, or patient and carer support, and only one each for assessment, carer training, and information and education.

Table 4-5. Percentage (%) of Recommendations from CPGs According to Strength of Evidence and Specificity to Aphasia

Clinical Practice Guideline	**Strength of Evidence**	**Specificity of Recommendation to Aphasia Management**		**Total**
		Aphasia-Specific	Aphasia-related	
Aust/NZCGSM and SIGN 108	Grade A	0/20 (0%)	3/30 (10%)	3/50 (6%)
	Grade B	2/20 (10%)	4/30 (13%)	6/50 (12%)
	Grade C	6/20 (30%)	8/30 (27%)	14/50 (28%)
	Grade D	2/20 (10%)	6/30 (20%)	8/50 (16%)
	Good Practice Point	10/20 (50%)	9/30 (30%)	19/50 (38%)
	Total	**20**	**30**	**50**
NICE 162	Strong	8/10 (80%)	9/31 (29%)	17/41 (41%)
	Weak	0/10 (0%)	1/31 (3%)	1/41 (2%)
	Consensus Statement	2/10 (20%)	21/31 (68%)	23/41 (56%)
	Total	**10**	**31**	**41**

Note. Total recommendations equal more than the number of overall recommendations due to multiple individual recommendations being synthesised. For explanation of evidence gradings see key from Table 4-4.

Table 4-6. Number of Recommendations According to Topic Category and Specificity to Aphasia

Topic Category	Aphasia-Specific (n = 13)	Aphasia-Related (n = 21)	Total (n = 34)
Screening Assessment	1	0	1
Goal Setting	0	3	3
Treatment Amount, Timing, Intensity	2	3	5
Family and Conversational Partner Training	1	1	2
Therapy approaches	8	0	8
Information, Education and Aphasia-Friendly information	1	5	6
Counselling	0	3	3
Support – Client and Carer	0	5	5
Return to Work	0	1	1
Total	**13**	**21**	**34**

4.5 Discussion

This is the first known attempt to identify, evaluate and distill post-stroke aphasia recommendations from all high quality CPGs. The lack of evidence-based aphasia-specific recommendations for specific topic areas indicate gaps in the research evidence. In particular, the aphasia-specific recommendations for goal-setting, support, and counselling, were all consensus statements. This suggests the need for further robust research to provide evidence on which to base future recommendations in these areas. These findings echo the results of Rohde and colleagues (2013) who stated that, "the lack of comprehensive aphasia recommendations across CPGs represents a shortcoming within current stroke management recommendations" (p. 8).

More than a third (42/111, 37.8%) of the recommendations extracted from the guidelines were based on consensus. The AustCGSM describes its 'Good Practice Points' as "*Recommended best practice based on clinical experience and expert opinion*", where, in instances of a lack of robust evidence, there was sufficient consensus among the guideline development group (National Stroke Foundation, 2010, p. 4). Alternatively, the NICE 162 guideline development group used a modified Delphi approach to develop consensus statements, whereby group members were presented with potential statements based on recommendations originating from other published CPGs (see National Institute for Health

and Care Excellence, 2013a). The large proportion of consensus-based recommendations in our study are similar to those of an analysis of the previous versions of the AustCGSM, where over a third (35% and 37% respectively) of the recommendations in the Clinical Guidelines for Acute Stroke Management (2007) and the Clinical Guidelines for Stroke Rehabilitation and Recovery (2005) were found to be based on expert consensus opinion (Sangvatanakul et al., 2010).

Half (5/10, 50%) of the aphasia-specific recommendations from the Aust/NZCGSM were consensus statements, and the remainder consisted mainly of low evidence grading. This is likely a reflection of a developing field of research, where a proportion of the evidence is of low quality or still developing, due to the earlier phases of research on clinical outcomes (Robey, 2004). An analysis of the 339 aphasia treatment studies available on the Psychological database for Brain Impairment Treatment Efficacy (PsycBITE^{TM}) in 2008 revealed that only 7% of studies were randomised controlled trials (RCTs), with the majority (70%) being single-subject design (Togher et al., 2009). The lack of high-level aphasia evidence is supported by our findings, where none of the aphasia recommendations from the Aust/NZCGSM were Grade A - "*Body of evidence can be trusted to guide practice*" - and only two (2/10, 20%) were Grade B - "*Body of evidence can be trusted to guide practice in most situations*" (National Health and Medical Research Council, 2009). This could have implications for clinicians, as the lack of high-quality evidence may restrict the uptake of CPGs (Hadely et al., 2014).

4.5.1 *Challenges in Comparing Recommendations Across CPGs*

Two main challenges were encountered when comparing the recommendations from the different CPGs. The first was that each of the guidelines had a different scope, which led to differences in the topic areas and content of recommendations. There were few overlaps of topics between the SIGN 108 and Aust/NZCGSM guidelines, because SIGN 108 has a focus on assessment, investigation, immediate management and secondary prevention of stroke, rather than rehabilitation (Scottish Intercollegiate Guidelines Network, 2008). Hence, there was little need to synthesise topics between these CPGs. The NICE 162 and Aust/NZCGSM guidelines had similar scopes, and therefore a greater number (11) of similar recommendations were synthesised, particularly relating to aphasia therapy approaches, goal-setting, and information and education.

The second challenge was that the strength of the evidence was evaluated and graded differently in each CPG. In some cases, similar recommendations from different guidelines had different gradings. For example, recommendation 20 (as shown in Table 4-4) is rated as Grade A evidence in the Aust/NZCGSM, but rated as Grade D in the SIGN 108. This disparity between grading may be due to different years in which the guidelines were developed, as there is potential for additional high quality evidence to have been published in the period since the SIGN 108 was developed. For example, the citation given for the Aust/NZCGSM for this recommendation is a more recent systematic review of RCTs by Smith and colleagues (Smith et al., 2008), whereas the two citations given for the SIGN 108 recommendation (Choi-Kwon et al., 2005; van der Smagt-Duijnstee, Hamers, Abu-Saad, & Zuidhof, 2001) are questionnaire-based studies, which could explain the lower grading. CPGs are static by nature, as they are only as current as the evidence at the time of publication, and can therefore become outdated. As the CPGs included in this review were published in 2008 (SIGN 108), 2010 (Aust/NZCGSM), and 2013 (NICE 162), it follows that the more recent guidelines would include newly published evidence that could affect the grading of the recommendations.

Alternatively, and/or additionally, the differences in grading could be due to the use of different grading systems. The Aust/NZCGSM used the National Health and Medical Research Council levels of evidence and grades of recommendation (2009), whereas the SIGN 108 used the Scottish Intercollegiate Guidelines Network's method of grading guideline recommendations (Scottish Intercollegiate Guidelines Network, 2011). While it appears that these grading systems are similar, there are small differences (such as Level I evidence consisting of a systematic review of RCT studies in the NHMRC system, compared with three distinct Level I categories in the SIGN system depending on the risk of bias present in the systematic review or RCT) that may account for some variances in grading the evidence.

In order to overcome the issue of different rating systems, it has been proposed that a consistent approach should be used. The Grading of Recommendations Assessment, Development and Evaluation (GRADE) system was developed as a systematic, transparent and standardised method of guideline development (Guyatt et al., 2008). More than 50 organisations worldwide have adopted the GRADE system, including the World Health Organization and the Scottish Intercollegiate Guidelines Network, (Scott & Guyatt, 2011).

The NICE 162 guideline used the GRADE system to evaluate the evidence and formulate their recommendations with some slight modifications, such as using the wording of the recommendation to reflect the strength of the recommendation instead of labels or symbols (National Institute for Health and Care Excellence, 2013b).

Although the NICE 162 used the GRADE system, at times it was unclear how the strength of the recommendation was linked to the underlying evidence. For example, the recommendation related to return to work (Recommendation 34 in Table 4-4) was graded as "strong", but was linked to one randomised controlled trial that was rated by the guideline development group as having very low confidence in effect. The methodology used to grade the evidence by the Aust/NZCGSM and SIGN 108 was clear as there were direct citations used for each recommendation to denote the underlying evidence.

It was difficult to compare the GRADE system used in the NICE 162 with the grading systems used by the other CPGs, due to the differences in the strength of recommendations categories. The GRADE system uses only two strength of the recommendation categories (strong and weak), compared with the five categories (A, B, C, D and Good Practice Point) used by the SIGN 108 and Aust/NZCGSM. Despite these challenges, the different grading systems (shown in Table 4-5) did not change the overall results of our study. It is anticipated that comparison between CPGs will become easier and more transparent if guideline developers use a single system, such as the GRADE system, when CPGs are updated.

4.5.2 *Lack of Inclusion of People with Aphasia in Stroke Studies*

It was a challenge to determine if the cited evidence was aphasia-related as per the definition for this study. Some of the studies included people with aphasia, some did not specify, and some excluded those with aphasia. The inclusion of people with aphasia in stroke trials is necessary to strengthen the evidence base for this aphasic population and increase clinical applicability of research findings (Ali et al., 2013; Brady et al., 2013). Our findings further highlight the importance of reporting whether people with aphasia were included in trials, so that it could be more easily determined whether the results were applicable to those with aphasia.

4.5.3 *Challenges in Linking the Evidence with the Recommendations*

Over 10% of recommendations (12/111, 10.8%) were excluded due to unclear links between the recommendation and underpinning evidence. One of these recommendations originated

from the AustCGSM, stating that, "*Stroke survivors and their families/carers should be given the opportunity to participate in the process of setting goals unless they choose not to or are unable to participate*" (National Stroke Foundation, 2010). The citation given for this recommendation is entitled *Organised inpatient (stroke unit) care for stroke* (Stroke Unit Trialists' Collaboration, 2007). However, a search of this publication indicated no clear link between this article and the resulting guideline recommendation on goal setting. A search of the Cochrane Library on July 18, 2013, revealed a protocol for a planned review of goal-setting in rehabilitation, however there was no relevant Cochrane Review published at the time the AustCGSM was developed. It is possible that the incorrect citation was due to a misprint, and that a different article was the intended reference, but an alternative article could not be located.

The remainder of recommendations with unclear links (10/11, 90.9%) was from the NICE 162. Specifically, several of the recommendations relating to aphasia management, including assessment and type of treatment, were formulated from a systematic review conducted for the research question, "*In people who have aphasia after stroke is speech and language therapy compared to no speech and language therapy or placebo (social support and stimulation) effective in improving language/communication abilities and/or psychological wellbeing?"* (National Institute for Health and Care Excellence, 2013a, p. 27). It was not clear how the guideline development group arrived at some of these recommendations from the evidence used (refer to Supplementary Table 1 for more information). The NICE 162 guideline has been criticised for using inappropriate methods of evaluating the evidence, and for producing recommendations written in unclear and unhelpful language (see Drummond & Wade, 2014). While the majority of recommendations extracted from the NICE 162 were clearly linked to the underlying evidence, the fact that there were several inconsistencies is problematic.

4.5.4 ***Study Limitations***

There are a number of limitations to this study. Firstly, only two evaluators independently assessed the CPGs. While the AGREE Next Steps Consortium (2009) reports this is an acceptable number of reviewers, the reliability of the ratings may have increased by evaluation using more appraisers. Other limitations may include bias concerning language and a restricted search strategy. Another potential limitation of this study is the process used to identify the recommendations, as there was no precedent. The majority of decisions about

whether to include recommendations were based on novel criteria on a case-by-case basis developed through consensus by the authors. Therefore, the process has not been replicated. Furthermore, the searching and screening process was conducted by only one person (the primary author). We have attempted to make this process transparent and replicable by including detailed methodology and supplementary information documenting these decisions. Another limitation is that, due to the challenges in linking some of the recommendations with the underlying evidence, some recommendations may have been excluded from our study.

4.5.5 *Implications*

This study identified 76 (34 evidence-based, 42 consensus-based) recommendations that can be used to guide speech pathology post-stroke aphasia management. These recommendations relate to speech pathologists' scope of practice in the management of post-stroke aphasia, originating from high-quality CPGs. Several gaps for aphasia-specific recommendations were noted, indicating possible areas for a future research agenda. In particular, there were no aphasia-specific recommendations identified for goal-setting, counselling, or patient and carer support, and only one each for assessment, carer training, and information and education.

The static nature of CPGs is one of their inherent problems. For this reason, there may be the need for a dynamic knowledge synthesis tool, which can be frequently updated, and incorporate recommendations from a number of evidence sources.

4.6 Conclusion

This study has identified and evaluated the recommendations from the highest quality guidelines relevant to post-stroke aphasia management. Thirty-four evidence-based recommendations that are applicable to aphasia management and consistent with the underlying evidence were found. The collated list of recommendations may assist clinicians in identifying which recommendations from which high quality CPGs are applicable to their management of post-stroke aphasia.

There appear to be many gaps in the research for people with aphasia, and broader stroke research often does not include people with aphasia in their trial population. Thus, several areas on which to focus aphasia-specific research have been identified.

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Chapter 5: Priorities for Closing the Evidence-Practice Gaps in Aphasia Rehabilitation: A Scoping Review

In Chapter 4, the collated recommendations from four high quality clinical practice guidelines were identified, which included 34 evidence-based and 42 consensus-based recommendations. However, due to finite and competing healthcare resources, and the complexity of developing and executing implementation efforts, as discussed in Chapters 2 and 3, implementation efforts need to be prioritised. Hence, the study reported in Chapter 5 subsequently developed and applied a prioritisation process to potential implementation topics.

First, the 34 evidence-based recommendations from Chapter 4 were grouped into 13 discrete topic areas. Then, as there was limited literature on how to prioritise implementation efforts, a novel approach was developed which included applying seven criteria to each topic area, using a scoping review methodology. In view of the limited literature in this area, an initial set of criteria for identifying implementation priorities were generated from the research team based on previous experience. A subsequent literature search did not identify any other implementation criteria, but further reinforced the seven initial criteria.

This study addressed the aim of identifying priorities for implementation in aphasia rehabilitation based on criteria and evidence from the literature, to pave the way for the development of an implementation intervention that would have the greatest chance of success. The priorities for implementation in aphasia management identified in this Chapter form the basis for the remaining studies in this thesis.

The content of this chapter has been published in the peer-reviewed journal, Archives of Physical Medicine and Rehabilitation:

Shrubsole, Worrall, Power, & O'Connor. (2017). Priorities for closing the evidence-practice gaps in post-stroke aphasia rehabilitation: A scoping review. *Archives of Physical Medicine and Rehabilitation;* in press (doi: 10.1016/j.apmr.2017.08.474).

The content included in this chapter is identical to the submitted manuscript; however, the formatting has been modified to match the style of this thesis.

5.1 Abstract

Objective: To identify implementation priorities for post-stroke aphasia management relevant to the Australian healthcare context.

Data Sources: Using systematized searches of databases (CINAHL, Medline), guideline and stroke websites, and other sources, evidence was identified and extracted for seven implementation criteria for 13 topic areas relevant to aphasia management. These seven priority-setting criteria were identified in the implementation literature; *strength of the evidence*; *current evidence-practice gap*; *clinician preference*; *client preference*; *modifiability*; *measurability*; and *health impact*.

Study Selection: Articles were included if they were in English, related to a specific recommendation requiring implementation, and contained information pertaining to any of the seven prioritisation criteria.

Data Extraction: The scoping review methodology was chosen to address the broad nature of the topic. Evidence was extracted and placed in an evidence matrix. Following this, evidence was summarised, then aphasia rehabilitation topics prioritised using an approach developed by the research team.

Data Synthesis: Evidence from 100 documents was extracted and summarised. Four topic areas were identified as implementation priorities for aphasia: Timing, Amount and Intensity of Therapy; Goal Setting; Information, Education and Aphasia-Friendly Information; and Constraint-Induced Language Therapy.

Conclusions: Closing the evidence-practice gaps in the four priority areas identified may deliver the greatest gains in outcomes for Australian stroke survivors with aphasia. Our approach to developing implementation priorities may be useful for identifying priorities for implementation in other healthcare areas.

Keywords: aphasia, stroke, clinical practice guidelines, knowledge translation, implementation.

5.2 Introduction

The failure to translate research evidence into clinical practice results in 'evidence-practice gaps'. Evidence-practice gaps have been found in many areas of healthcare and can result in suboptimal care (Grimshaw, Eccles, Lavis, Hill, & Squires, 2012; Grol & Grimshaw, 2003). A landmark study by McGlynn and colleagues found that patients in the USA received guideline-recommended care on average 55% of the time (2003). Similar evidence-practice gaps have also been observed in Australia (Runciman et al., 2012) and in aphasia rehabilitation (Hubbard et al., 2012; National Stroke Foundation, 2014).

There is a need to close these evidence-practice gaps by engaging in implementation activities. Implementation ensures that stakeholders, including healthcare professionals, consumers and policy makers, are aware of and actively use research evidence to inform health and healthcare decision-making (Grimshaw et al., 2012). A substantial body of evidence about the effects of implementation strategies is now available to inform the selection and design of implementation activities to close evidence-practice gaps (Grimshaw et al., 2015; Grimshaw et al., 2012). However, limited evidence is available to inform and prioritise which evidence-based practices should be targeted for implementation.

In an environment of competing demands for finite health resources, implementation targets need to be prioritised and selected, often from a large set of evidence-based recommendations. Healthcare professionals such as Speech-Language Pathologists (SLPs) have reported the limited feasibility of implementing every single guideline recommendation (Miao, Power, & O'Halloran, 2014). Methods for identifying implementation priorities have received little attention in the literature to date (Farley, Thompson, Hanbury, & Chambers, 2013), and there is no consensus on the best approach of how to prioritise implementation targets at a national level.

There are a number of criteria that could be used to prioritise implementation efforts, which have been suggested to be important factors in implementation. For example, the Strength of the Supporting Evidence is an important consideration as clinicians are more likely to implement Clinical Practice Guideline (CPG) recommendations that are based on strong supporting evidence (Goossens, Bossuyt, & de Haan, 2008; Grol & Wensing, 2004). Information on the Evidence-Practice Gap is important to identify the degree to which current practice differs from guideline recommendations, and whether or not implementation efforts are required (Kitson & Straus, 2010; National Institute of Clinical Studies, 2006). Evidence

of Client and Clinician Preference for implementation is also important, as patient and family expectations can influence change (Glasziou & Haynes, 2005; Grol & Wensing, 2004), and local opinion leaders and existing culture can influence stakeholder support (Flodgren et al., 2011; Grol & Wensing, 2004; National Institute of Clinical Studies, 2006). Other potentially important criteria include: Measurability – the ability to measure change in professional behaviours and/or patient outcomes compared to baseline data (National Institute of Clinical Studies, 2006; Scott et al., 2012), Modifiability - the complexity of the behaviours being changed or the presence of multiple or non-modifiable barriers (Baker et al., 2010; Grol & Wensing, 2004; National Institute of Clinical Studies, 2006), and Health Impact - evidence of important health impact resulting from a change in the recommended practice or behavior, including patient outcomes, quality of care and/or economic outcomes (Grol & Wensing, 2004; National Institute of Clinical Studies, 2006).

Despite general agreement on the importance of the priority criteria, very few studies have applied these to identify implementation priorities in any given clinical area. Two approaches to identify implementation priorities are previously reported in the literature; a modified Delphi method and conjoint analysis, both focussing on investigating stakeholders' priorities for implementation. Bayley and colleagues used a modified Delphi method to prioritise clinical areas ready for implementation in stroke rehabilitation (Bayley et al., 2007) and traumatic brain injury (Bayley et al., 2014) in Canada. In these studies, a panel of stakeholders was invited to consider issues such as the strength of the supporting evidence, the prevalence of the health problem, the potential impact of improved care, and the feasibility of conducting an implementation intervention to determine priorities for implementation efforts (Bayley et al., 2007; Bayley et al., 2014). Farley and colleagues used Conjoint Analysis to rank stakeholder implementation priorities in postnatal depression (2013). Health care professionals working in a UK Primary Care Trust were sent a questionnaire and asked to rate 16 hypothetical scenarios containing potential implementation targets with varying attributes (e.g. strength of supporting evidence, impact on patient care, cost etc). This approach produced a ranked list of implementation priorities (for example, 'self-help' was rated as the top priority for implementation and 'screening questions for post-natal depression' was ranked lowest). However this approach was limited by a low response rate (11%) and uncertainty in stability of stakeholder preferences over time.

5.2.1 *Implementation Priorities in Aphasia*

To date, there have been no systematic attempts to identify implementation priorities for aphasia management. However, there is evidence to support the need for implementation. Aphasia is often a chronic condition, associated with poor functional recovery and poor quality-of-life (Engelter et al., 2006; Hilari et al., 2010). Despite the poor outcomes for people with aphasia and the increasing recognition that aphasia is an important research priority (Pollock, St George, Fenton, & Firkins, 2012), there are many evidence-practice gaps in aphasia practice. For example, in the Australian context, a rehabilitation audit of stroke guideline adherence found 58% adherence to recommendations for aphasia management (Hubbard et al., 2012). In the USA, only 22% of SLPs conduct Constraint-Induced Language Therapy (Page & Wallace, 2014), an intervention of proven benefit (Cherney, Patterson, Raymer, Frymark, & Schooling, 2008).

While evidence-practice gaps in post-stroke aphasia management exist, it is unclear which of these areas should be priorities for implementation. Previous work by our team has identified 34 evidence-based aphasia and general stroke rehabilitation recommendations from high-quality CPGs (Shrubsole, Worrall, Power, & O'Connor, 2016). The aim of this study is to identify the priorities for implementation in post-stroke aphasia management, relevant to the Australian context, by conducting a scoping review of relevant literature.

5.3 Methods

5.3.1 *Design:*

We undertook a scoping review to evaluate the literature pertaining to seven implementation criteria (strength of the evidence; current evidence-practice gap; clinician preference; client preference; modifiability; measurability; and health impact) for topics in aphasia rehabilitation. These criteria were selected by the research team and informed by supporting literature on attributes considered important to decision makers for prioritising implementation efforts and the teams' experience in past projects. An initial set of criteria for identifying implementation priorities were generated and discussed among the research team. A search of the literature was then conducted to ascertain if the initial criteria set required elaboration or refinement. Searches were conducted in PubMed and Google Scholar for articles referring to criteria and other considerations relating to priority-setting for implementation. Search terms included: implementation, knowledge translation, priority-setting, prioritization/prioritisation, and criteria. No language or date limits were applied.

From the discussion amongst the research team and search, the researchers agreed on a final set of seven criteria and definitions were developed for each criterion (see Table 5-1).

A scoping review was selected in order to address this broad topic of implementation, whereby different study designs may be relevant and iterative decisions need to be made once a familiarity with the literature is gained (Levac, Colquhoun, & O'Brien, 2010). We then extracted the data, synthesised and summarised the evidence, and ranked topics to prioritise areas for implementation. The steps in this process are described below.

5.3.2 *Systematised searches:*

Systematised searches were conducted for 13 topic areas for aphasia management, and the seven implementation criteria. This approach involved only one reviewer due to the scope of the paper and resource constraints (Grant & Booth, 2009). The aphasia rehabilitation topic areas that were selected were:

- Screening Assessment,
- Goal Setting,
- Timing, Amount, and Intensity of Therapy,
- Conversation Partner Training/ Supported Conversation,
- Cognitive Neuropsychological-Based Therapy,
- Constraint-Induced Language Therapy,
- Compensatory Strategies/AAC,
- Computer-Based Therapy,
- Group Therapy,
- Information/Education and Aphasia-Friendly Information,
- Counselling,
- Caregiver Support, and
- Return to Work.

These topics were selected based on our previous paper (Shrubsole et al., 2016), where we identified 34 evidence-based aphasia and general stroke rehabilitation recommendations from high-quality Clinical Practice Guidelines (CPGs). The 34 CPG recommendations were then categorised into the 13 topics areas to make managing and summarising the data more manageable. The working definitions and source/s from which the implementation criteria were identified are shown in Table 5-1.

For Criterion 1 (*Strength of the Evidence)*, the Clinical Practice Guidelines from which the recommendations arose were the primary sources of data (National Institute for Health and Care Excellence, 2013; National Stroke Foundation, 2010; Stroke Foundation of New Zealand and New Zealand Guidelines Group, 2010). The evidence grading for the recommendations contained in the 13 topic areas was extracted from these clinical practice guidelines (see online Supplementary Table 1). The recommendations pertaining to aphasia management in the Australian and New Zealand guidelines are identical and were therefore combined (Aust/NZCGSM).

For the remaining six criteria, systematic searches of two electronic databases (CINAHL, Medline) were undertaken to identify relevant evidence. Search terms included population (aphasia OR dysphasia), key words per topic area (e.g., for 'Screening Assessment' search terms included assessment OR tool OR screener OR screening) and criteria (e.g., for 'Current Evidence-Practice Gap' search terms included current practice OR practice OR gap OR service OR survey). Pearling references from relevant articles and searches of speech-language pathology and aphasia websites (e.g., www.rcslt.org/; http://speechbite.com) were also undertaken. Articles were included if they were in English, related to a specific recommendation requiring implementation, and contained information pertaining to any of the seven prioritisation criteria. No search limitations were placed on the date of publication. The final search was run on 14 November 2014. Detailed search information can be found in Appendix B.

5.3.3 ***Screening:***

The first author (KS) conducted the literature searches, then screened potential results by abstract, retrieved the full text and excluded those that did not meet the criteria.

5.3.4 ***Data Collection and Analysis:***

An 'Evidence Matrix' was developed to collate data from each systematic review of each implementation criteria per aphasia topic. As this Evidence Matrix was too extensive and complex for decision-making, the data was then summarised to show the strength of the evidence of each criteria in a snapshot. This allowed for comparisons across topic areas. For *Strength of the Evidenc*e, where multiple recommendations per topic area existed, the evidence grading from the recommendation with the highest strength of evidence was used. Specifically, recommendations originating from the Aust/NZCGSM were classified using the NHMRC evidence ratings (National Health and Medical Research Council, 2009); as *High*

evidence = A or B, *Moderate evidence* = C, or *Low evidence* = D. Recommendations from the NICE 162 was classified using the GRADE evidence ratings (Guyatt et al., 2008) as *High evidence* = Strong, or *Low evidence* = Weak.

Table 5-1. Definitions for Criteria for Identifying Implementation Priorities

Criteria	Definition	Rationale
1. Strength of the Evidence	Evidence grading as per relevant evidence-based Clinical Practice Guideline or systematic review.	Recommendations underpinned by strong evidence constitute important targets for change (there is a body of evidence that can be trusted to guide practice). Clinicians more likely to implement CPG recommendations if they are based on strong evidence. (Goossens, Bossuyt, & de Haan, 2008; Grol & Wensing, 2004).
2. Current Evidence-Practice Gap	Evidence of the difference between recommended practice (from research evidence) and current practice – taken from clinical audits, surveys or other sources.	Important to identify which areas have evidence-practice gaps that need addressing. Areas demonstrating higher evidence-practice gaps may constitute more important priorities for implementation (with greater room for improvement). (Kitson & Straus, 2010; National Institute of Clinical Studies, 2006).
3. Clinician Preference	Evidence of preference or stakeholder support for performing the recommended practice from the perspective of clinicians (in this instance speech-language pathologists).	Local opinion leaders and existing culture can influence change. (Flodgren et al., 2011; Grol & Wensing, 2004; National Institute of Clinical Studies, 2006).
4. Client Preference	Evidence of preference or stakeholder support for performance of the recommended practice from the perspective of healthcare consumers, i.e., people with aphasia or carers/family members.	Patients'/family members' expectations can influence change. Patients need to agree with the recommended practice and be able to comply with it. (Grol & Wensing, 2004).
5. Modifiability	Evidence of barriers and facilitators to implementation, such as complexity of behaviour or resources required to change.	More complex behaviours may be more difficult to change. Behaviours may be more difficult to change where multiple or non-modifiable barriers exist. Important to identify barriers to change to tailor interventions. (Baker et al., 2010; Grol & Wensing, 2004; National Institute of Clinical Studies, 2006).

6. Measurability	Evidence of the measurability of performance of the recommended practice, in terms of feasibility of data collection and potential for bias.	Performance of recommended practices may be measured using different data collection methods and sources (e.g. via patient medical records, clinician self-report, routinely collected data). These methods may vary in terms of feasibility of data collection and potential for bias. Behaviours for which performance is feasible to measure and in a manner that minimises bias are most desirable. (National Institute of Clinical Studies, 2006).
7. Health Impact	Evidence of important health impact resulting from a change in the recommended practice or behavior (including patient outcomes, quality of care and/or economic outcomes).	Health impact should incorporate patients' capacity to benefit from treatment. Economic advantage could be attractive to organisations and influence change. (Grol & Wensing, 2004; National Institute of Clinical Studies, 2006).

The evidence for the remaining six criteria (*Current Evidence-Practice Gap, Clinician Preference, Client Preference, Measurability, Modifiability*, and *Health Impact)* was evaluated using a decision-making process that was developed iteratively by the authors during the analysis phase, in the absence of specific published methods (see Figure 5-1). The *Current Evidence-Practice Gap* data was calculated by determining the difference between current practice in each specific topic area and 100% guideline adherence (i.e. 100% - current practice percentage). Where evidence was found for the implementation criteria (e.g., *Current Evidence-Practice Gap*), this was classified as either qualitative or quantitative. Where data was found for current practice in both stroke and aphasia populations, the data from aphasia practice was used. For quantitative data, evidence was classified as Low (for <50% uptake of evidence, not a significant p value, or inconsistent or small effect sizes), Moderate (for 50-74%) or High (>75%, a significant p value or a large effect size). The decision to use quartiles to evaluate the uptake of recommendations was based on a similar study in falls prevention (Centre for Research Excellence in Patient Safety, 2012). Qualitative evidence was symbolized using QUAL, with either a '**+**' to signify that the evidence was in support of implementation, or '**–**' sign to indicate the evidence did not support implementation, such as negative patient reports or barriers to implementation. For an illustrative example of this process, please refer to Figure 5-2.

When reviewing and synthesising this evidence, it became apparent there were potentially important differences between data reported relevant to criteria 2 – 6 in studies conducted in different countries (e.g. data on evidence-practice gaps for group therapy in Australia vs. in other countries). Given this study aimed to prioritise topics for implementation in post-stroke aphasia management relevant to the Australian setting, it was determined that the summary of the evidence relating to criteria 2 – 6 would only include studies conducted in Australia.

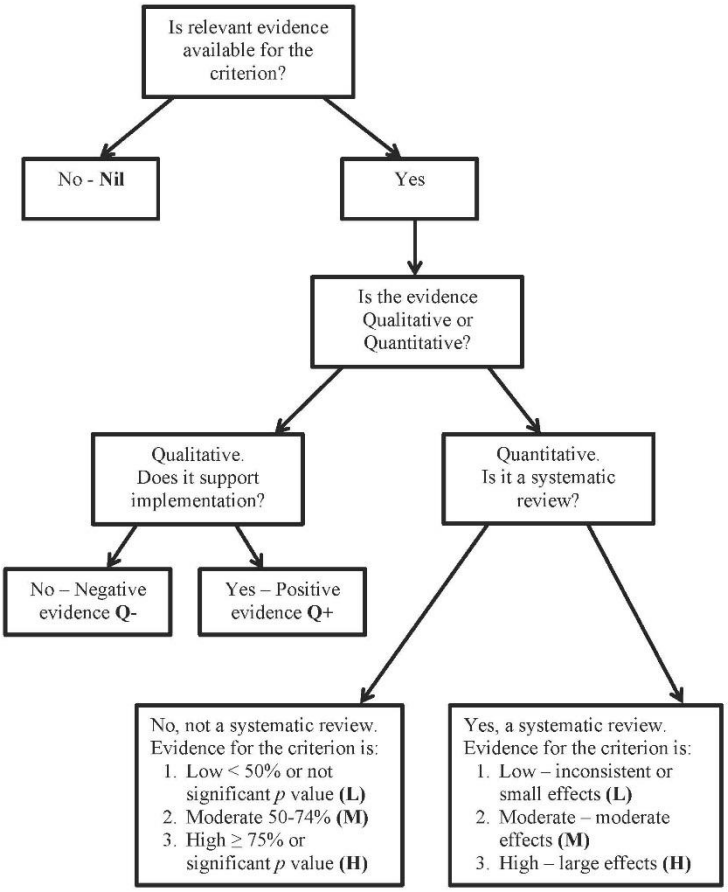

Figure 5-1. Decision-Making Process for Classification of Evidence

Implementation Criteria	Evidence Found	Classification of Evidence
1. Strength of the Evidence	4 recommendations from CPGs, highest level of evidence = B *(National Stroke Foundation, 2010)*	HIGH
2. Current Evidence-Practice Gap	13-21% gap in rehabilitation setting *(National Stroke Foundation, 2012, 2014)*	LOW
	73% gap in acute setting *(National Stroke Foundation, 2011)*	MODERATE
3. Clinician Preference	Qualitative evidence in support of goal-setting (*Rose, Ferguson, Power, Togher, & Worrall, 2013; Rohde et al., 2012; Brown, Worrall, Davidson, & Howe, 2011)*	QUAL+
4. Client Preference	Qualitative evidence in support of goal-setting *(Worrall et al, 2010; Worrall et al, 2011; Tomkins, Siyambalapitiya, & Worrall, 2013)*	QUAL+
5. Modifiability	Qualitative evidence of barriers to implementation *(Levack et al., 2006a; Playford et al., 2009; Scobbie et al., 2011; Van De Weyer et al., 2010)*	QUAL-
6. Measurability	No evidence of data collection for aphasia	QUAL-
	Potential to compare future data to results of stroke audit data	QUAL+
7. Health Impact	Inconsistent evidence about generalised effectiveness *(Levack, et al 2006)*	LOW

Figure 5-2. Evidence Decisions for Goal-Setting Topic

5.3.5 ***Prioritisation of Topics for Implementation***

The 13 topic areas were prioritised according to the summarised data for the seven criteria. Since stronger evidence is more likely to be implemented (Goossens et al., 2008; Grol et al., 1998) and areas with large evidence-practice gaps should be implementation targets (Kitson & Straus, 2010; National Institute of Clinical Studies, 2006), the first two criteria were weighted more heavily. The remaining criteria were considered with equal weighting as there was no clear reason or precedent in the literature to prioritise one over the other. A decision-making tree was developed, where topic areas were considered to be of highest priority for implementation where evidence was as follows:

a) ‘High’ evidence for *Strength of the Evidence*, **and**
b) ‘High’ or ‘Moderate’ evidence for *Current Evidence-Practice Gap,* **and**
c) Evidence available to support implementation in any of the other criteria (*Clinician Preference, Client Preference, Measurability, Modifiability*, and *Health Impact*), with topics ranked according to the total support across the seven criteria.

Priority Topics were then ranked based on the total support for (c). That is, topics areas for which we identified evidence for more criteria in ‘c’ were ranked higher than those that had fewer criteria.

5.4 Results

5.4.1 *Initial Data Extraction*

The evidence matrix is presented in the supplementary online material as Table 1. The general stroke rehabilitation recommendations for *Strength of the Evidence* are presented in the first column for the 13 topic areas. For evidence of the *Current Evidence-Practice Gap, Clinician Preference, Client Preference,* and *Health Impact*, 2009 documents were identified for screening. Of these, 1909 documents were excluded, and findings from the remaining 100 were included (see PRISMA flowchart, Figure 5-3). As *Modifiability* was related specifically to implementation barriers or enablers, and a preliminary search found limited literature in this area for aphasia, data for this criterion was used from search results for other criteria. Similarly, as information relevant to *Measurability* was not specifically reported in any of the studies retrieved, judgments were made about the complexity of the behaviours to be measured and whether this data appeared to be routinely collected (as determined in findings from the *Current Evidence-Practice Gap* searches).

5.4.2 *Summary of the Existing Evidence for Implementation*

a) *Strength of the Evidence.* Seven of the 13 topic areas were underpinned by high evidence (A or B level in the AustCGSM or Strong in the NICE162): Goal Setting; Timing/Amount and Intensity of Therapy; Conversation Partner Training; Constraint Induced Language Therapy; Information/Education and Aphasia-Friendly Information; Counselling; and Return to Work. A further five topic areas were underpinned by moderate evidence: Screening Assessment; Cognitive Neuropsychological-Based Therapy; Computer-Based Therapy; Group Therapy; and Caregiver Support.

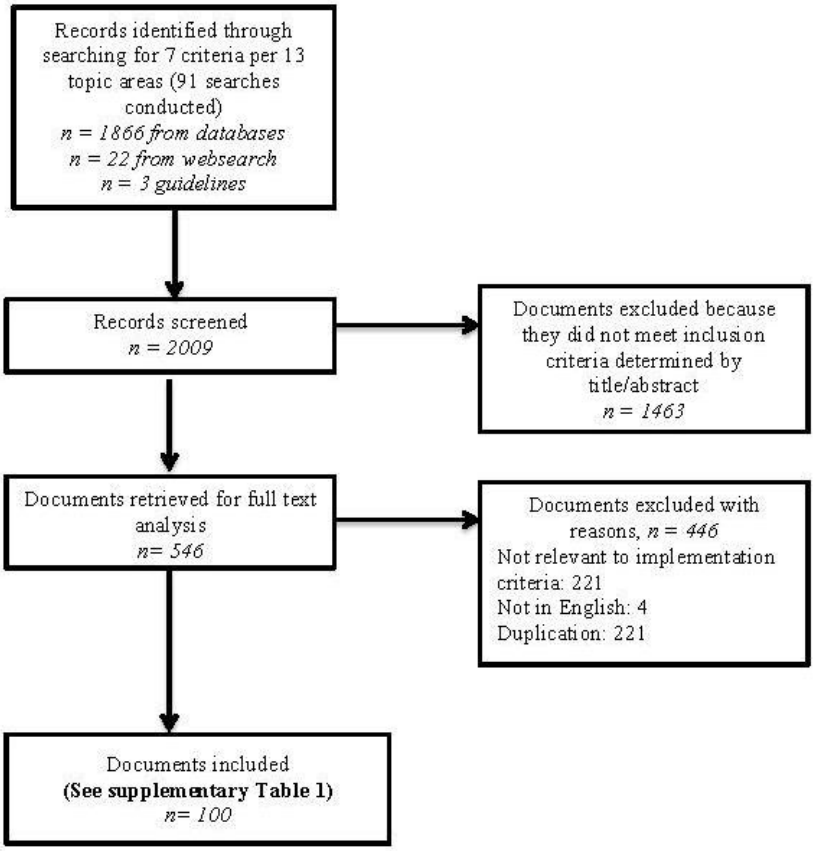

Figure 5-3. PRISMA Flow Chart of Included Studies

b) *Current Evidence-Practice Gap.* Six topic areas had gaps of moderate-to-high magnitude: Goal Setting (acute setting); Timing/Amount and Intensity of Therapy (acute and rehabilitation settings); Constraint Induced Language Therapy (rehabilitation setting); Computer-Based Therapy (rehabilitation setting); Group Therapy (acute and rehabilitation settings); and Information/Education and Aphasia-Friendly Information (acute and rehabilitation settings). The remaining seven topics had gaps of low magnitude: Screening Assessment; Conversation Partner Training; Cognitive Neuropsychological-Based Therapy; Compensatory Strategies/AAC; Counselling; Caregiver Support and Return to Work.

c) *Clinician Preference.* There was evidence that clinicians perceived eight topic areas to be important (six via qualitative studies and two via quantitative studies). These were Goal Setting; Timing/Amount and Intensity of Therapy; Conversation Partner Training; Compensatory Strategies/AAC; Computer-Based Therapy; Information/Education and Aphasia-Friendly Information; Counselling; Caregiver Support. There was evidence that clinicians had either negative perceptions of, or no identified implementation need for, the

following topics: Screening Assessment; Cognitive Neuropsychological-Based Therapy, Constraint Induced Language Therapy; and Group Therapy. For example, the majority of clinicians rated knowledge of and confidence with cognitive neuropsychological approaches as very good/good or very high/high (Rose, Ferguson, Power, Togher, & Worrall, 2013). There was no Australian evidence found for clinician views on the topic Return to Work.

d) *Client Preference.* There was also evidence that patients perceived ten topic areas to be important (eight from qualitative studies, one from a quantitative study). These included Goal Setting; Timing/Amount and Intensity of Therapy; Conversation Partner Training; Cognitive Neuropsychological-Based Therapy; Compensatory Strategies/AAC; Group Therapy; Information/Education and Aphasia-Friendly Information; Counselling; Caregiver Support; and Return to Work. There was evidence that clients had negative perceptions of Constraint Induced Language Therapy, with only 3/11 clients expressing preference for CILT compared to Multi-Modal Aphasia Therapy (Rose, Attard, Mok, Lanyon, & Foster, 2013). There was no Australian evidence found for client views on the topics Screening Assessment and Computer-based Therapy.

e) *Modifiability.* While several topics (Timing, Amount and Intensity of Therapy, Carer Training/Conversation Partner Training, and Counselling) had evidence from qualitative studies of both barriers and facilitators to implementation, almost a third (4/13, 31%) had no information available.

f) *Measurability.* Six topics (46%) included complex behaviours that were either difficult to observe or not routinely collected. These included Goal Setting; Conversation Partner Training; Cognitive Neuropsychological-Based Therapy; Information/Education and Aphasia-Friendly Information; Counselling; Caregiver Support.

g) *Health Impact.* The majority of topics (9/12, 75%) had evidence of a significant health impact or large effect size. The remaining topics had inconsistent (Goal Setting and Cognitive Neuropsychological-Based Therapy) or moderate (Timing/Amount and Intensity of Therapy) effects.

A summary of the extracted evidence for each criterion per topic area is shown in Table 5-2.

5.4.3 ***Prioritisation process***

Four priority topic areas were identified for implementation in post-stroke aphasia rehabilitation. The topics “Information, Education and Aphasia-Friendly Information” and “Timing, Amount and Intensity of Therapy” were ranked equal first priority. “Goal Setting”

was ranked third, and "Constraint-Induced Language Therapy" was ranked fourth for implementation. This decision-making process is shown in Figure 5-4.

The first two prioritised areas ("Information, Education and Aphasia-Friendly Information" and "Timing, Amount and Intensity of Therapy") had moderate or high evidence-practice gaps, and supporting evidence for all other criteria. "Goal-setting" had moderate or high evidence-practice gaps and had supporting evidence for 80% of the remaining criteria. "Constraint-Induced Language Therapy" had moderate or high evidence-practice gaps with supporting evidence for only two criteria (40%), but no Australian information on clinician preference, poor patient satisfaction, and evidence of barriers for implementation.

Criteria	**Topic**						
a) Strength of the Evidence **HIGH**	Goal Setting	Timing, Amount, Intensity of Therapy	Carer Training/ Conversation Partner Training	CILT	Information, Education and Aphasia-Friendly Information	Counselling	Return to Work
AND	↓	↓	✖	↓	↓	✖	✖
b) Evidence-Practice Gap **MODERATE** or **HIGH**	Goal Setting	Timing, Amount, Intensity of Therapy		CILT	Information, Education and Aphasia-Friendly Information		
AND	↓	↓		↓	↓		
c) Other supporting evidence (Criteria 3-7)	Goal Setting (4/5)	Timing, Amount, Intensity of Therapy (5/5)		CILT (2/5)	Information, Education and Aphasia-Friendly Information (5/5)		
Priority Rank	**3rd**	**1st (equal)**		**4th**	**1st (equal)**		

Figure 5-4. Prioritisation of Implementation Topics

Table 5-2. Summary of the Implementation Evidence Matrix

Topic Area	**Criteria**						
	1. Strength of Evidence (area of practice)	2. Current Evidence-Practice Gap	3. Perceived importance – Clinicians	4. Perceived Importance – Client	5. Modifiability	6. Measurability	7. Health Impact
1. Screening Assessment	C Aphasia **(M)**	18-23% gap (a + r) **(L)**	44% **(L)**	**Nil**	**Nil**	**Q+**	**Q+**
2. Goal Setting	B Stroke **(H)**	13-21% gap (r) **(L)** 73% gap (a) **(M)**	**Q +**	**Q +**	**Q-**	**Q+, Q-**	Inconsistent **(L)**
3. Timing, Amount, and Intensity of Therapy	B Aphasia **(H)**	50% gap (r) **(M)** 75-91% gap (a) **(H)**	100% **(H)**	97% **(H)**	**Q+, Q-**	**Q+**	Moderate **(M)**
4. Conversation Partner Training/ Supported Conversation	B Stroke **(H)** C Aphasia **(M)**	8-24% gap (r) **(L)** 31% gap (a) **(L)**	**Q +**	**Q +**	**Q+, Q-**	**Q+, Q-**	Significant effect **(H)**
5. Cognitive Neuropsychological-Based Therapy	C Aphasia **(M)**	25% gap (r) **(L)**	**Q -**	**Q +**	**Nil**	**Q+, Q-**	Inconsistent **(L)**
6. Constraint-Induced Language Therapy	B Aphasia **(H)**	86% gap (r) **(H)**	0 **(L)**	27% **(L)**	**Q-**	**Q+**	Large effects **(H)**
7. Compensatory Strategies/AAC	D Aphasia **(L)**	39% gap (r) **(L)**	100% **(H)**	54% **(M)**	**Q+**	**Q+**	Significant effect **(H)**
8. Computer-Based Therapy	C Aphasia **(M)**	86% gap (r) **(H)**	**Q +**	**Nil**	**Q+**	**Q+**	Significant effect **(H)**
9. Group Therapy	C Aphasia **(M)**	46-80% gap (r) **(M)** 100% gap (a) **(H)**	**Q -**	**Q +**	**Nil**	**Q+**	Medium-large effects **(M-H)**
10. Information/Education and Aphasia-Friendly Information	A Stroke **(H)** D Aphasia **(L)**	51% gap (aphasia a + r) **(M)** **28% gap (stroke r)* ***(L)***	**Q +**	**Q +**	**Q+**	**Q+, Q-**	Significant effects **(H)**
11. Counselling	B Stroke **(H)**	34% gap (aphasia a + r) **(L)**	**Q +**	**Q +**	**Q+, Q-**	**Q+, Q-**	Significant effect **(H)**

		68% gap (stroke rehab)* *(M)***					
12. Caregiver Support	C Stroke **(M)**	41% gap (aphasia a + r) **(L)** **38-68% gap (stroke r)* ***(M)***	**Q +**	**Q +**	**Q+**	**Q+, Q-**	Significant effects **(H)**
13. Return to Work	Strong **(H)**	14-31% gap (r) **(L)**	**Nil**	**Q +**	**Nil**	**Q +**	Significant effects **(H)**

Key

H High evidence (A or B on AustCGSM/Strong on NICE 162; ≥ 75% for Criteria 2-6; Significant clinical outcome or large effects for Criteria 7)

M Moderate evidence (C on AustCGSM; 50-74% for Criteria 2-6; Moderate effects for Criteria 7)

L Low/inconsistent evidence (D on AustCGSM/Weak on NICE 162; < 50% for Criteria 2-6; Not significant clinical outcome or inconsistent/small effects for Criteria 7)

Nil No information found

Q+ Qualitative evidence to support implementation

Q- Qualitative evidence not supportive of implementation

* Where data present for aphasia and stroke populations, stroke data not used

a Acute setting

r Rehab settin

5.5 Discussion

This study sought to identify priorities for implementation in post-stroke aphasia management relevant to the Australian setting. This is the first attempt to our knowledge of applying a criteria-based priority-setting process to identify clinical topic areas and their associated recommendations ready for implementation in aphasia rehabilitation.

Using multiple pre-defined prioritisation criteria was a novel component of this study. While previous work has suggested a range of different factors to consider when deciding on which evidence to implement (Grol & Wensing, 2004; National Institute of Clinical Studies, 2006), none of these studies used a priori criteria to evaluate the evidence for implementation. Some targeted attempts at priority-setting have been undertaken that have focused on using a consensus approach (Bayley et al., 2007; Bayley et al., 2014) or Conjoint Analysis for treatment preferences (Farley et al., 2013; Laver et al., 2011), but these did not extract, summarise and rank the evidence for a predetermined set of criteria as we have done. In this way, we have built on previous priority-setting attempts and provided a broad helicopter view of the available evidence for implementation across aphasia management recommendations in the Australian context. However, the benefits of this approach need to be considered alongside the considerable amount of work that it requires.

Although seven criteria were used in our scoping review, it is unclear which of these are the best to use, and whether all of them are necessary. It could be argued that the first two criteria, *Strength of the Evidence* and *Current Evidence-Practice Gap,* would provide a quicker and more pragmatic way to prioritise implementation targets. In this study, we found that these criteria had complete data sets, and the evidence for these was relatively easy to locate and extract from the scoping search. However, given that there is evidence that other criteria such as client and clinician preference can impact on the success of implementation, there is potential to overlook important information if using a pared-down approach.

5.5.1 *Locating Existing Data for the Implementation Criteria*

Searching for and synthesising the relevant data sets for aphasia-related topics was a challenge, as data relating to several criteria was often difficult to find. There was a lack of information available related to *clinician* and *client preferences*. Evidence relating to these criteria was often not the focus of the study, but embedded within it. One Australian study did directly examine speech-language pathologists' priorities (Rose, Ferguson, et al., 2013) but determined research priorities rather than priorities for implementation. Other criteria with

limited quantitative data were *modifiability* and *measurability*. The *modifiability* criteria depended on reported barriers for each implementation topic, and these varied between clinical contexts (Goossens et al., 2008). *Measurability* of guideline-recommended behaviours was not specifically reported in any of the studies examined. While incomplete data sets for these criteria was discouraging, it was not surprising, given that there has been limited research into the factors influencing implementation in aphasia, highlighting a need for further research.

5.5.2 *Determining the 'Linkages' and Accuracy of the 'Gap' Data*

The majority of information found for the *current evidence-practice gap* comprised audit or survey data, however the practice being measured did not always correspond to the guideline recommendation. For example, the Australian rehabilitation stroke audit (National Stroke Foundation, 2014) found that 96% of the recommended intensity of swallowing and communication therapy was provided in clinical practice, but the audit did not measure intensity of communication therapy alone. It is suggested that future audit tools be more closely linked to the clinical practice guideline recommendations.

One topic area, *Carer Training/Conversation-Partner Training* (CPT), showed some particularly interesting findings that may warrant further investigation. For CPT, the evidence-practice gap was low (8-24% gap) in the rehabilitation setting (National Stroke Foundation, 2014; Verna, Davidson, & Rose, 2009), indicating that clinicians are using it 76-92% of the time. However, clinicians have reported low use and poor or very poor confidence with CPT approaches (Rose, Ferguson, et al., 2013). These contradictory results may suggest that clinicians are not confident about implementing CPT but have implemented it nevertheless. Alternatively it could suggest that the audit data recorded incidences of general advice given to carers about communicating with the person with aphasia, while SLPs who responded to the survey may define Communication Partner Training as a specific technique such as that described by Kagan and colleagues (Kagan, Black, Duchan, Simmons-Mackie, & Square, 2001). These uncertainties highlight a need for specific and accurate audit data on current aphasia rehabilitation practices by speech-language pathologists.

5.5.3 *Implementation Priorities*

The four implementation priorities that we identified originate from recommendations referring to different aspects of SLPs' aphasia management practices: 1."Information, Education and Aphasia-Friendly Information" refers to the process of providing written,

tailored, aphasia-friendly information at different stages of recovery; 2. "Timing, Amount and Intensity of Therapy" refers to the timing, dosage and duration of therapy, but does not specify the type of therapy that should be provided; 3. "Goal Setting" refers to a collaborative process of identifying patient-related goals that are documented and updated regularly; and 4. "Constraint-Induced Language Therapy" is a specific type of therapy approach (National Stroke Foundation, 2010). Although we considered clinicians' preferences for implementation in our prioritisation process, this was based on the limited published evidence (discussed above), and future research should focus on prospectively identifying clinicians' implementation priorities to determine if they align with our findings.

Although we used Australian evidence-practice gap data in our decision-making process, the results from this study may be relevant to aphasia management in other countries. The evidence informing prioritisation of implementation targets was sourced internationally, therefore could be applied to local evidence-practice gap data elsewhere.

5.5.4 *Study Limitations*

Searching for evidence relevant to the seven priority-setting criteria was challenging, potentially meaning that not all relevant evidence was found and summarised here. Furthermore, one member of the research team conducted many aspects of the decision-making process (e.g., searching for, screening and extracting data for the evidence matrix). While this is acceptable within some definitions of a scoping search (Grant & Booth, 2009), two or more researchers should ideally undertake these tasks independently to reduce the potential for bias (Levac et al., 2010). The date of the last run search is also a limitation of the study, however a new targeted search revealed that it is unlikely that we have missed relevant papers. Finally, the thresholds for categorizing the evidence into high, moderate and low was based on earlier work (Centre for Research Excellence in Patient Safety, 2012) although the cut-off values were somewhat arbitrary.

5.6 Conclusion and Implications

This study identified potential implementation priorities for post-stroke aphasia management in Australia. The study highlights the current evidence and gaps in evidence for implementation criteria. Further research is needed in several areas, including evaluating clinician and patient preferences and the feasibility of implementation. Moreover, it is suggested that audit tools are developed that can accurately measure each recommendation requiring implementation.

Priority-setting for implementation is a complex process that requires further investigation. It remains to be seen whether expert opinion, systematic reviews across all seven criteria or just the two most-important criteria produce similar results. It is anticipated that the priority-setting framework we have presented could serve as a guide to researchers and stakeholders both in stroke and aphasia rehabilitation and in other areas of healthcare. Furthermore, this process could form the basis of a national strategy to improve implementation efforts in aphasia management, as closing the evidence-practice gaps in the identified priority areas may deliver the greatest gains in outcomes for stroke survivors with aphasia.

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Chapter 6: Barriers and Facilitators to Meeting Aphasia Guideline Recommendations: What Factors Influence Speech Pathologists' Practice? A Qualitative Study.

Having identified implementation priorities in Chapter 5, the next step was to identify the perceived barriers and facilitators to implementation experienced by speech pathologists who provide services to people with post-stroke aphasia. The results of the study presented in Chapter 6 will be used to determine which theoretical domains should be targeted by an implementation intervention.

With this in mind, a decision was made by the research team to include an additional area of practice, Conversation Partner Training (CPT), in place of the prioritised area of Constraint-Induced Language Therapy (CILT) that was identified in Chapter 5. This decision was made for a number of reasons. Specifically, although the practice area of Constraint-Induced Language Therapy (CILT) was identified as a high priority (priority number 4), there is currently debate about whether the positive results shown are due to the intervention itself or the dosage and intensity of therapy (Rose, Attard, Mok, Lanyon, & Foster, 2013). In addition, this type of therapy is resource intensive, and there was no funding available to provide additional staffing for an implementation intervention targeting this practice area. Hence, while the investigation of barriers to implementing CILT is needed, it was not feasible within this thesis. Therefore, CILT was investigated as part of a barriers survey conducted outside of this thesis, which is currently under review in the journal *Aphasiology* (Young, Shrubsole, Worrall & Power, 2018). This survey showed that the main barriers for CILT were the theoretical domains of *skills*, *behavioural regulation* and *intentions*.

As described in the methods section of this chapter, the practice area of CPT was selected due to some interesting discrepancies between the reported evidence-practice gaps and clinician reports identified in Chapter 5. That is, although there was limited evidence of an evidence-practice gap according to national audit data, clinicians have reported 'low use' of this approach. In addition, the previous implementation studies in aphasia, which are reviewed in Chapter 3, have all implemented interventions that address the practice of CPT. As it was not known which practice areas would form the targets of the implementation interventions to be

conducted in Phase IV of the thesis, the research team decided to include CPT with the view that it may be selected as a target for Phase IV.

The content included in this chapter has been adapted from a manuscript entitled "Barriers and facilitators to meeting aphasia guideline recommendations: What factors influence speech pathologists' practice?" which has been published in the peer-reviewed journal, *Disability and Rehabilitation*.

Shrubsole, Worrall, Power, & O'Connor. (2018). Barriers and facilitators to meeting aphasia guideline recommendations: What factors influence speech pathologists' practice? *Disability and Rehabilitation,* early online (doi.org/10.1080/09638288.2018.1432706)

6.1 Abstract

Purpose: To explore factors influencing Australian speech pathologists' guideline recommended aphasia management practices.

Methods: Semi-structured interviews were conducted with hospital-based speech pathologists (n = 20). Interviews focused on barriers and facilitators to implementing recommendations related to five practice areas: *Aphasia-friendly Information; Collaborative Goal Setting; Timing of Therapy; Amount and Intensity of Therapy;* and *Conversation Partner Training.*

Results: Speech pathologists working only in inpatient rehabilitation settings reported performing the recommended behaviours consistently, and identified few implementation barriers. However, clinicians working in the acute setting reported performing the majority of behaviours inconsistently or rarely.

Seven (of 14) Theoretical Domains Framework domains were identified as key influencing factors. Three of these - 'Environmental Context and Resources', 'Beliefs about Consequences' and 'Social Influences' - were consistently reported as influencing practice across *all* five behaviours. Other important domains included 'Knowledge', 'Beliefs about Capabilities', 'Goals' and 'Social/Professional Role and Identity', which each influenced at least two practice behaviours.

Conclusions: Speech pathologists report a number of key factors influencing their practice, which differ in how they influence behaviours (i.e. a factor may be a barrier or a facilitator) depending on the behaviour and clinical setting. Future implementation interventions need to account for the strong influence of beliefs and social influences on speech pathology practice, which may facilitate successful implementation.

Keywords: aphasia, stroke, implementation, evidence-based practice, barriers, enablers

6.2 Introduction

A number of high-quality clinical practice guidelines (CPGs) are available to assist speech pathologists in their management of people with aphasia. We recently identified four high-quality clinical practice guidelines for aphasia, which included 34 evidence-based recommendations relevant to aphasia management (Shrubsole, Worrall, Power, & O'Connor, 2016). From these recommendations, we have then developed implementation priorities for aphasia management within the Australian context (Shrubsole, Worrall, Power, & O'Connor, 2017).

Despite the availability of CPGs, there is considerable variation in practice for people with aphasia across the continuum of care, also called an evidence-practice gap. In the acute setting, an audit of Australian practice showed that 75% of people with aphasia who were appropriate candidates for aphasia therapy did not receive any intervention for the duration of their in-hospital admission (Godecke, Hird, Lalor, Rai, & Phillips, 2011). A rehabilitation audit (Hubbard et al., 2012) found 58% adherence to the aphasia recommendations in the Australian Clinical Guidelines for Stroke Management (National Stroke Foundation, 2010). It is important to improve adherence to aphasia recommendations; adherence to stroke CPGs has been shown to be effective in changing both the processes and outcomes of care (Thomas et al., 1999), and is associated with better post-stroke recovery outcomes (Hubbard et al., 2012).

Many factors may contribute to the variation in speech pathologists' aphasia management practices. An understanding of these factors is necessary to improve evidence uptake (Baker et al., 2010; Graham et al., 2006; Grol & Wensing, 2004). Implementation interventions that are tailored to prospectively identified are more effective than non-tailored interventions or passive guideline dissemination (Baker et al., 2010; Baker et al., 2015).

There is emerging research about factors influencing speech pathologists' implementation of stroke clinical practice guidelines in general. A qualitative interview study (Miao, Power, & O'Halloran, 2014) and survey (Hadely, Power, & O'Halloran, 2014) have reported barriers to uptake that relate to the guideline itself (e.g., insufficient detail in recommendations), patient-related factors (e.g., stroke/aphasia severity), clinician factors (e.g., insufficient skills) and the work environment (e.g., staffing ratios). However, greater specificity in the barriers to, and enablers of, implementation of aphasia-specific recommendations is needed to inform design of tailored implementation strategies in this clinical context.

There is some evidence that clinicians hold complex and often emotionally conflicted views about provision of aphasia services, including issues surrounding the emotional drain of providing therapy and counselling (Rose, Ferguson, Power, Togher, & Worrall, 2013), and in some cases, a sense of disempowerment in their ability to provide acute aphasia management (Foster et al, 2016). The clinical setting in which the speech pathologist works may be especially important, with suggestions that implementing aphasia-related practices are more difficult in the acute setting (Simmons-Mackie et al., 2007). These issues need to be explored further in relation to specific aphasia guideline recommendations, as factors influencing guideline adherence can vary depending on the practice being recommended (Lugtenberg, Zegers-van Schaick, Westert, & Burgers, 2009).

A further limitation of existing aphasia barriers research is the absence of theory use in exploring the reasons for, and designing strategies to address, implementation problems. Studies in this area to date have not utilised theories of behaviour change to inform study design or for interpreting the findings (Foster et al, 2016; Rose et al., 2013). The use of theory has been advocated as important in identifying factors influencing behaviour change, establishing explicit causal pathways of the determinants of behaviour change, and informing the design of tailored implementation interventions (Eccles, Grimshaw, Walker, Johnston, & Pitts, 2005; Eccles et al., 2007; Estabrooks, Thompson, Lovely, & Hofmeyer, 2006; Michie et al., 2005).

While it is acknowledged that no single theory can fully explain or predict health professionals' behaviour, one framework has been developed that integrates several theories of behavior change into a single model. The Theoretical Domains Framework (TDF), developed by Michie and colleagues (2005), synthesised 33 theories and 128 key theoretical

constructs related to behaviour change, resulting in 14 theoretical domains (Cane, O'Connor, & Michie, 2012). Each domain includes multiple constructs, whereby a theoretical construct is defined as a component part of a theory (Michie et al., 2005). For example, the domain '*knowledge'*, defined as 'an awareness of the existence of something', includes the constructs *knowledge, procedural knowledge,* and *knowledge of task environment*. The TDF has been used in many areas of healthcare to identify barriers and facilitators to evidence uptake (Alexander, Brijnath, & Mazza, 2014; Murphy et al., 2014), and used to guide the development of behaviour change interventions (French et al., 2012; Tavender et al., 2015). However, to date, no study has used the Theoretical Domains Framework to prospectively identify barriers and facilitators to implementation of aphasia clinical practice guideline recommendations.

This study aims to explore the factors (i.e. barriers and facilitators) that influence speech pathologists' use of evidence-based recommendations in five priority areas of aphasia management identified in our previous study (Shrubsole et al., 2017) using the Theoretical Domains Framework. These areas of aphasia management – *Aphasia-Friendly Information Provision; Collaborative Goal Setting; Timing of Therapy; Amount and Intensity of Therapy;* and *Conversation Partner Training* - are presented in Table 6-1, along with the specific recommendations relating to these practices as detailed in the *Clinical Guidelines for Stroke Management* (National Stroke Foundation, 2010). A secondary aim of this study was to understand the findings in the context of organisational and clinician-related factors, particularly in relation to the acute and rehabilitation settings. Findings will inform the design of implementation interventions that aim to improve implementation of aphasia guideline recommendations.

6.3 Methods

6.3.1 ***Design:***

Qualitative semi-structured interviews were conducted with Australian speech pathologists to explore their views, opinions and experiences of their usual practice in regards to five clinical practice areas in aphasia management and proposed explanations for practice not consistent with guideline recommendations. Ethical clearance was obtained from The University of Queensland, School of Health and Rehabilitation Sciences refer to Appendix C-1. All participants provided written informed consent. The current report adheres to the

consolidated criteria for reporting qualitative research (COREQ), attached in Appendix C-2 (Tong, Sainsbury, & Craig, 2007).

6.3.2 ***Sample:***

Speech pathology participants were recruited through a speech pathology email discussion group with 1680 members. Purposive sampling was undertaken to gain a maximum variation sample of speech pathologists working in aphasia rehabilitation within hospitals (either acute or inpatient rehabilitation) in the Australian states of New South Wales and Queensland. Diversity in the following characteristics was considered necessary to achieve a maximum variation sample: years of clinical experience, role (e.g., base-grade vs senior clinician), clinical setting (e.g., acute or rehabilitation), and aphasia caseload percentage. We aimed to get equivalent representation across the different criteria, and continued recruitment until thematic saturation was reached (Guest, Bunce, & Johnson, 2006). These criteria were selected to ensure that viewpoints from clinicians with different clinical roles, years of experience and settings relevant to aphasia management were represented. To be eligible, participants must have provided rehabilitation to at least three people with aphasia in the preceding six months, demonstrating an active caseload of relevant patients.

Table 6-1. Evidence-Based Recommendations per Topic Area

Recommendations (from *Clinical Guidelines for Stroke Management*, National Stroke Foundation, 2010)

Practice Behaviour 1. Collaborative Goal Setting	
1	Health professionals should collaboratively set goals for patient care.
2	Goals should be prescribed, specific and challenging.
3	They should be recorded, reviewed and updated regularly.
4	The stroke team should meet regularly with the patient and their family/carer to involve them in management, goal setting and planning for discharge.
Practice Behaviour 2. Aphasia-friendly Information Provision	
5	All stroke survivors and their families/carers should be offered information tailored to meet their needs using relevant language and communication formats.
6	In patients with aphasia, all written information on health, aphasia, social and community supports should be available in an aphasia-friendly format.
7	Information should be provided at different stages in the recovery process.
8	Stroke survivors should be provided with routine, follow-up opportunities for clarification or reinforcement of the information provided.

Practice Behaviour 3. Conversation Partner Training	
9	Relevant members of the multidisciplinary team should provide specific and tailored training for carers/family before the stroke survivor is discharged home.
10	For individuals with aphasia, intervention can include supported conversation techniques.
Practice Behaviour 4. Timing of Therapy	
11	Treatment for aphasia should be offered as early as tolerated.
Practice Behaviour 5. Amount and Intensity of Therapy	
12	As much therapy for communication difficulties should be provided as can be tolerated.

6.3.3 *Materials:*

A topic guide for the semi-structured interviews was developed, based on the Theoretical Domains Framework (Francis, O'Connor, & Curran, 2012; Michie et al., 2005) (refer to Appendix C-3 for an example of the topic guide). Interviews focused on barriers and facilitators to implementing recommendations in the five priority areas of aphasia management (see Table 6-1). Four of the five practices (*Timing of Therapy*, *Amount and Intensity of Therapy*, *Collaborative Goal Setting*, and *Information Provision*) were initially prioritised in our previous study (Shrubsole et al., 2017). The final area of practice, *Conversation Partner Training/Supported Conversation*, was also prioritised after some potential discrepancies between the reported evidence-practice gaps and clinician reports were identified. That is, while a national stroke audit showed that clinicians are providing supported conversation training 76-92% of the time (National Stroke Foundation, 2012; Stroke Foundation, 2016), therapists have reported low use and poor or very poor confidence with Conversation Partner Training (CPT) approaches (Rose et al., 2013).

The interviews aimed to elicit information about participants' current practice in relation to each recommended practice behaviour and the factors (barriers and facilitators) they perceived to be influencing their implementation of the recommendations in their practice.

The topic guide was drafted by the first author and then refined by an author with expertise in the Theoretical Domains Framework and discussed by the research team to check clinical relevance. The questions were then piloted with two speech pathologists working with clients with aphasia to gauge clarity and acceptability. Minor modifications to wording in order to reach the final version.

6.3.4 ***Procedure:***

Interviews were conducted face-to-face or via Skype by the first author, a qualified and experienced speech pathologist with 13 years of clinical experience in stroke rehabilitation. At the time of the study, this author was employed on a casual basis at a local health service and had contact with three participants as a colleague. Participants may have known of the interviewer from previous clinical roles or through the profession generally, however the majority of participants were unknown to the interviewer. Participants were advised that judgments would not be made about what was said during the interview, and all content would be confidential. Interviews were conducted at a time and place convenient to participants, with interview locations mainly consisting of speech pathology clinics. No non-participants were present during the interviews. Following the interviews, field notes were made by the interviewer. Interviews were recorded then transcribed verbatim by either KS, student speech pathologists from The University of Queensland, or a professional transcriber employed by The University of Queensland. The interviewer then proofread the transcripts, editing where necessary to ensure accuracy.

6.3.5 ***Data analysis:***

The interview data was analysed using content analysis, with factors influencing practice coded to the domains in the Theoretical Domains Framework (Francis et al., 2012; Michie et al., 2005). Transcripts were imported into QSR International's NVivo 10 qualitative data analysis software (QSR International Pty Ltd, 2012). All four team members coded a section of the first interview, and agreed upon a coding frame. The frame was based on the 14 domains of the Theoretical Domains Framework, with 'constructs' or subdomains of each domain coded as subcategories. Additional codes were added as necessary to explore potential themes outside the Theoretical Domains Framework. Each recommended practice behaviour was coded separately for each participant. The transcripts were coded iteratively by the first author, to inform when saturation was met. Peer checking was conducted by an independent researcher, a speech pathology research student with knowledge of the Theoretical Domains Framework, who coded four randomly selected transcripts in order to enhance trustworthiness. Discrepancies were discussed until consensus was reached.

A domain was considered important according to saliency analysis - i.e., factors that were frequently mentioned, were deemed to be of high importance by the researchers or participants, or had both of these attributes (Buetow, 2010). For each participant, key barriers

and facilitators were identified for each practice behaviour. The results were then collated for all participants, and the key influencing factors emerged where frequently mentioned barriers or facilitators were identified.

6.4 Results

6.4.1 *Participants*

28 participants indicated their willingness to be interviewed and underwent a screening phone call to determine eligibility and identify sample characteristics for maximum variation. All were screened and 20 were purposively sampled using the maximum variation criteria framework with the results detailed in Table 6-2. In addition, participants were asked how frequently they undertook the recommended behaviours (i.e., frequently, sometimes, often, never) to ensure that their level of implementation varied.

Interviews were conducted over a seven-month period (May 2015 to November 2015). Twenty speech pathologists were interviewed, with a mean age of 29.2 years (range 23-39) and an average of 6.2 years clinical experience (range 1-17). The majority (8/20)

Table 6-2. Demographic Characteristics of Participants (n=20)

Demographic Variable	**n**	**%**
Caseload/Clinical setting		
Acute	5	25%
Inpatient Rehabilitation	7	35%
Combination acute/rehabilitation	8	40%
Gender		
Female	20	100%
Male	0	0
Age		
20-25	4	20%
26-30	9	45%
31-35	6	30%
35-40	1	5%
Clinical experience (Years)		
0-5	8	40%
6-10	9	45%
11-15	2	10%
>15	1	5%

Overall mean = 6.2		
Clinical Role		
Base-grade (L1/2 or HP3)	5	25%
Senior (>L3 or >HP4)	11	55%
Team Leader/Manager	2	10%
Private SP (no grading)	2	10%
Percentage of caseload aphasia		
0-20	7	35%
21-40	6	30%
41-60	4	20%
61-80	3	15%
81-100	0	0
Location		
Metropolitan	16	80%
Rural	4	20%

worked across multiple settings, with the remainder working solely in either the inpatient rehabilitation or acute setting. Fifteen worked in either a senior or higher role. The median percentage of the caseload dedicated to aphasia management was 34% (5-80). Fifteen interviews were held face-to-face, and five were conducted via video conferencing with a mean interview duration of 68 minutes (SD 22 minutes).

6.4.2 *Self-reported current practice*

Practice behaviour 1: aphasia-friendly information provision - patients with post-stroke aphasia should be provided with tailored, written, aphasia-friendly information with follow-up opportunities throughout their recovery.

All speech pathologists working in rehabilitation reported that they always provided written information to people with aphasia in an aphasia-friendly format that was tailored to the patient's needs. The majority of the time, these clinicians conducted an entire session dedicated to information provision, often incorporating feedback from formal assessments, and would attempt to include family. For example, one participant stated, "*I would assess them first, diagnose, then give a feedback session where you provide the information and give them education about what aphasia is*," (ID03, Rehab). Several clinicians reported that their

department had developed their own materials and would adapt these for each individual based on their needs.

Speech pathologists working in acute or a combination of acute and rehabilitation roles were variable in their practice. Most reported they usually provided *verbal* information to people with aphasia, but provided written aphasia-friendly materials either 'sometimes' or 'rarely'. One participant working in both acute and rehabilitation settings reported, "*I provide usually more basic verbal information rather than written in those very early days. I find that being around to answer questions of families in terms of the acute dysphagia or acute communication issues is the most useful*." (ID01, Acute/Rehab). Another clinician explained, "*I definitely wouldn't give written information early on but certainly that verbal stuff and some basic understanding about what you're having trouble with and why and that sort of thing,"* (ID19, Acute/Rehab). Clinicians working in these roles reported that their approach was generally very flexible; often there was no specific plan to provide information, but they would take the opportunity if it arose (e.g., the patient asked or the family was available) or if the patient was 'ready' to receive that information.

Practice behaviour 2: collaborative goal setting - speech pathologists should engage in collaborative goal setting with people with aphasia to identify specific and challenging goals that are recorded and regularly reviewed.

Speech pathologists working in rehabilitation reported that they engaged in collaborative goal setting with people with aphasia most of the time or always. As with information provision, most of these clinicians dedicated a specific session to goal setting and conducted this in a structured way using specific resources. Several sites had a nominated person within the multidisciplinary team who was responsible for identifying the patient's overall rehabilitation goals, and these goals were reviewed at weekly case conference meetings; "*Once a week, we review patient goals...you know, where they're at from all disciplines*," (ID03, Rehab).

Speech pathologists working in acute or a combination of acute and rehabilitation roles were more variable in their practice, with some clinicians engaging in collaborative goal setting rarely or 'never'. While some reported having speech pathology goals for the patient, the majority reported many barriers to commencing the goal setting process, which are further described below. One acute speech pathologist stated, "*We're not really establishing goals for the patient. The main goal is to essentially get formal assessment commenced*," (ID14, Acute).

Practice behaviour 3: timing of intervention – speech pathologists should commence treatment of aphasia as early as tolerated.

Speech pathologists working in acute or a combination of acute and rehabilitation roles were variable in their practice in conducting therapy 'as early as tolerated'. Half of the clinicians reported they always offered therapy early (within the first few days), whereas the other half offered early therapy 'sometimes' (within the first week) or 'never' (rarely on the acute ward). Several clinicians reported there had been a distinct change in their service in recent years, with timing of aphasia therapy being given higher priority than in the past, and a recognition of the growing evidence-base in this field. One participant stated, *"I definitely think there's been a real shift in focus and push from within the speech pathology team to be starting intervention earlier and to really be doing a lot of therapy trials up on the ward. I don't really know whether that was a response to the NSF guidelines and research or whether that was dependent on the clinicians that we had here at the time*," (ID14, Acute). Despite this increased awareness, several participants reported that a multitude of environmental barriers (such as a lack of time, resources and competing demands) prevented them from being able to perform this behaviour as often as they would like. For example, one clinician stated, "*It's really hard to sort of say, 'Well, actually, someone's off sick today and I'm on the ward and I have to go to ED, so…no I can't do that, sorry'"* (ID01, Acute/Rehab).

Practice behaviour 4: amount and intensity of intervention – speech pathologists should provide as much treatment of aphasia as can be tolerated.

Speech pathologists working in rehabilitation-only roles conducted therapy 'as frequently as tolerated' for all or most patients, which was usually more than once a day. Most of these clinicians planned how many sessions were needed per week and negotiated this with the patient, then structured these sessions into the patient's timetable using a ward-based scheduling system. One participant stated, "*Depending on a patient's priorities in rehab, if they're pretty high, then we've been offering people twice a day*," (ID03, Rehab). Clinicians working in a combination of rehabilitation and acute roles generally conducted therapy once a day, with some clinicians reporting they could provide therapy only a few times a week, for example, "*I usually try and give like, at* ***least*** *3 sessions (a week*)," (ID08, Acute/Rehab). Similarly, acute-only clinicians rarely conducted therapy more than a few times per week. Most clinicians working in rehabilitation and a combination of roles had strategies about how to increase the frequency of therapy provision, such as using computer-based resources

("*There's a therapy computer we've got*," ID06, Rehab), Allied Health Assistants ("*Providing my AHA is here, (patients) will get seen twice daily*," ID13, Rehab), and student placements ("*Now we just take lots of students*," ID09, Rehab).

Practice behaviour 5: Conversation Partner Training – speech pathologists should provide specific and tailored training to the communication partners of the person with aphasia.

Speech pathologists working in the rehabilitation setting were more variable in their conversation partner training practices than the other practice behaviours investigated, with the majority reporting that they only sometimes provided conversation partner training to family members. This usually involved giving tailored strategies in a dedicated session, but typically did not utilise formal supported conversation programs or specific feedback on interactions. For example, one participant reflected, "*I've never actually used the technique of videotaping them and playing it back because I think it can be really confronting for some people*." (ID07, Acute/Rehab). Speech pathologists working solely in the acute setting conducted conversation partner training with families rarely, and reported many barriers and few facilitators to this practice; "*The idea of it (formal conversation partner training program) was great, it sounds really good and it's a lovely idea but it' s not feasible on an acute ward."* (ID18, Acute). Regardless of clinical setting, the majority of clinicians interviewed rarely provided conversation partner training to staff members working with people with aphasia (such as doctors, nursing staff or allied health professionals). Education mainly consisted of informally giving strategies to support conversation, but did not include actual skills training. Although speech pathologists perceived staff training to be important, the majority reported many barriers, including a lack of time and interest from the other health professionals. For example, one acute clinician stated, *"I don't generally find that the nursing staff or other Allied Health staff are asking, 'What would help, how can we communicate better with this person?*'" (ID18, Acute).

6.4.3 ***Key Influencing Factors***

The 'key influencing factors' for each practice area are presented in Figures 6-1 and 6-2. Seven (of 14) Theoretical Domains Framework domains were identified as the key influencing factors for the five guideline recommended practice behaviours. Three of these domains ('Environmental Context and Resources', 'Beliefs about Consequences' and 'Social Influences') were consistently reported as influencing practice across *all* five behaviours. Two domains were common influences for three recommended behaviours. 'Knowledge' was

influential in the implementation of *Information Provision, Amount and Intensity of Therapy* and *Conversation Partner Training*, while 'Beliefs about Capabilities' was reported as influencing implementation of *Information Provision, Collaborative Goal Setting,* and *Timing of Therapy*. Two other important domains were 'Goals' (influencing *Collaborative Goal Setting* and *Amount and Intensity of Therapy*) and 'Social/Professional Role and Identity' (influencing *Timing of Therapy*, and *Amount and Intensity of Therapy*). Further examples of quotes illustrating key influencing factors can be found in Appendix C-4, Tables S1 – S5.

6-1. Key Influencing Domain and Themes per Behaviour (part 1)

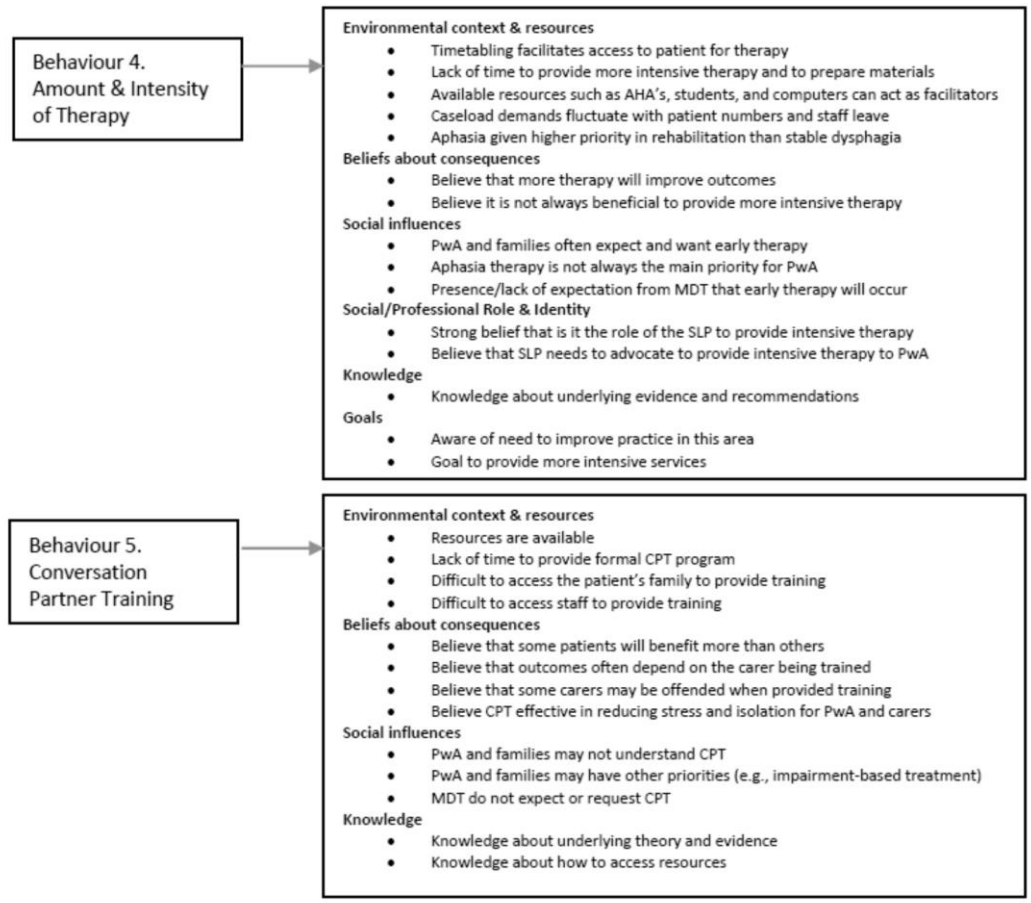

Figure 6-2. Key Influencing Domain and Themes per Behaviour (part 2)

6.4.3.1 Key Influencing Factor 1. Environmental Context and Resources.

'Environmental Context and Resources' was universally reported as a barrier for speech pathologists' implementation of all five practice behaviours in all settings. The only exception to this was that it was neither a barrier nor facilitator for *Aphasia-Friendly Information Provision* by speech pathologists working in rehabilitation settings. Themes identified in this domain were (i) resources, (ii) time, (iii) competing demands, (iv) the physical environment, (v) access to the patient and family, and (vi) organisational culture.

(i) Resources: One frequently reported barrier in this domain was a lack of appropriate resources developed for use with people with aphasia relevant to the clinical setting. This

was illustrated by one participant when discussing the challenges in finding a suitable resource for *Collaborative Goal Setting; "Particularly with (a person with aphasia) who can't really communicate, it's hard to use any of those formal things (tools),*" (ID04, Acute/Rehab).

(ii) Time: Additionally, a lack of sufficient time to implement the recommended practice behaviours was reported for several topic areas, including *Collaborative Goal Setting* and *Aphasia-Friendly Information Provision*. This was illustrated by another participant, when discussing barriers to goal setting; "*So it seems like we're trying to manage this acute caseload… we don't really have time as well to just sit down and nut out some goals which is sad, but reality,*" (ID14, Acute). When describing practice related to information provision, one participant reported that due to times constraints, she would usually, "…*Have a chat and get this done*," when the family was present on the ward, needing to, "…*Take that opportunity when it's there*" (ID18, Acute).

(iii) Competing caseload demands: For acute clinicians in particular, there were competing caseload demands that made it difficult to perform several aphasia guideline-recommended behaviours, such as providing therapy as early as possible. "*Often a new referral will come through and that patient might be nil by mouth and that unfortunately is just going to take priority over someone with aphasia.*" (ID14, Acute). In addition to challenges associated with therapy provision, clinicians working in the acute setting identified that providing information about aphasia was not always their highest priority; "*In the acute phase I'm just so focused on supporting them there and then, but I'm not like 'You have aphasia. This is what we're going to do. These are all the supports out there for you.' I'm just like, 'How can I get you to communicate?*'" (ID11, Acute/Rehab). In contrast, clinicians working exclusively in the rehabilitation setting reported being able to structure their time to ensure patients were provided with aphasia services, so that caseload structure acted as a facilitator in this context.

(iv) Physical environment: Beyond their own caseload management, speech pathologists reported challenges in the acute environment to providing information, early therapy and goal setting, due to the lack of environmental resources such as a suitable private and quiet space. This was illustrated by one participant when discussing information provision. "*One of the barriers in acute is that it can be hard to get rid of distractions..., you're in a 4-bed room, there's lots of noise, there's lot of distractions and don't always have the luxury of having a*

private space which would make it easier for that person to understand," (ID 01, Acute/Rehab).

(v) Access to patient/family: Speech pathologists in the acute setting also reported challenges in accessing the patient and/or family for aphasia management, making it difficult to engage in all of the recommended practice behaviours investigated. Barriers included the patient being off the ward for tests, or being seen by other health professionals, being fatigued or medically unwell. When discussing the provision of early therapy, one participant stated, *"It's really difficult, especially when they're still in the acute phase, too, to get them at a time when they are not with Physio or OT or not off getting a brain scan" (*ID07, Acute/Rehab*).* Conversely, speech pathologists working in rehabilitation acknowledged that access to the patient and their family facilitated implementation in several areas, including goal setting, for example, "*For those patients where the families are really involved, it does make like a lot easier*" (ID04, Acute/Rehab).

(vi) Organisational culture: Additionally, the organisational culture in the acute setting was often focussed on bed management, creating barriers to implementation. For example, goal setting was challenging for some clinicians because: *"There's no time to review the goals, there's no time to reset the goals, and then before you know it they're talking about discharging the patient,"* (ID01, Acute/Rehab). Several speech pathologists reported the organisational focus on discharge meant that aphasia was not given priority, impacting their ability to implement more intensive therapy; "*Sometimes if their language is the only thing (impaired), they'll just send them home*, " (ID11, Acute/Rehab). Another clinician stated, *"It was really surprising to me how comfortable people felt with, um...not seeing the communication-impaired patients as promptly or as frequently as I thought was indicated,"* (ID08, Acute/Rehab).

6.4.3.2 Key Influencing Factor 2. Beliefs about Consequences.

The Theoretical Domains Framework domain 'Beliefs about Consequences' was a facilitating factor for all five behaviours. This domain was also a barrier for *Collaborative Goal Setting* in the acute setting and for *Amount and Intensity of Therapy* for speech pathologists working in acute or a combination of settings. The themes within this domain related to beliefs about the (i) effectiveness of the recommended practice, and (ii) anticipated regret if the recommended practice was not implemented.

(i) Beliefs about the effectiveness of the recommended practice: Clinicians working in rehabilitation and a combination of roles reported positive beliefs about the effectiveness of the recommended practices for several behaviours, including *Information Provision, Collaborative Goal Setting, Conversation Partner Training,* and *Amount and Intensity of Therapy*. For example, one participant described her belief that providing information was reassuring to patients; "*I also think from a mental and emotional point of view it helps to have that reassurance of,* 'I actually know what happened to me*,'* " (ID19, Acute/Rehab). In contrast, some speech pathologists working in acute settings were more mixed in their beliefs, particularly in relation to *Amount and Intensity of Therapy* and *Collaborative Goal Setting*. For example, one participant was uncertain about the benefits of providing intensive aphasia therapy, "*I don't know that having a high intense approach would be very beneficial in an acute stage …*" (ID20, Acute). When discussing goal setting, another participant held the belief that goals would not improve outcomes; *"He's going to improve with or without goals. That's what I think."* (ID16, Acute).

(ii) Anticipated regret: Some clinicians described anticipated regret if the recommended practice was not implemented, particularly in the rehabilitation setting. For example, it was described as a "*missed opportunity"* (ID06, Rehab) if *Conversation Partner Training* was not provided, and that clinicians were "*short-changing"* patients if intensive therapy was not provided (ID03, Rehab). When describing the lack of ability to provide aphasia therapy in the acute setting, one participant stated, "… *She's probably going to sit on a waiting list somewhere or not get very regular or intensive therapy*," (ID18, Acute). This anticipated regret seemed to act as motivation to implement the behaviours of interest.

6.4.3.3 Key Influencing Factor 3. *Social Influences.*

'Social Influences' influenced all behaviours, with a mix of positive and negative influences reported. This mixture of social influences – where the domain appeared to act as both a barrier and facilitator - was seen in three of the behaviours investigated: *Information Provision, Collaborative Goal Setting,* and *Amount and Intensity of Therapy*. 'Social Influences' was only a facilitating factor for *Timing of Therapy,* and only a barrier for *Conversation Partner Training*. Within this domain, the themes related to (i) patient and family expectations and priorities, (ii) staff/colleague expectations, and (iii) leadership.

(i) Patient and family expectations and priorities: Participants reported the expectations and priorities of both patients and families influenced their implementation of the recommended

practice behaviours. These influences varied depending on the setting and the recommended practice behaviour being discussed. For example, speech pathologists reported that some patients did not want to engage in intensive therapy as it wasn't their main rehabilitation priority; "*I guess it's just how it fits in terms of their overall goal, so if they want to focus on physio, and they're fatiguing because they're in speech every second day, then that's not ideal for them,*" (ID03, Rehab). However, other patients expected more frequent therapy; "*If clients don't get to see you that day, they're like, "So why aren't I seeing you?""* (ID09, Rehab). For *Information Provision*, acute clinicians stated that some patients did not want, or were not ready, to receive written information; "*Often I'll give the person a choice whether they want written information or not. Most people actually…they don't actually want it.*" (ID19, Acute/Rehab). Conversely, rehabilitation clinicians viewed patient and family expectations as a facilitator to implementation of this same recommendation later in recovery.

(ii) Staff and colleague expectations: Speech pathologists also reported mixed expectations from colleagues. While many clinicians described the positive influence of the multidisciplinary stroke team on their implementation of the recommended practice behaviours, others described a feeling of not being supported in their role, and a general lack of understanding of the importance of aphasia and the guideline-recommended behaviours. One participant stated, "*The rehab physician assessed her, she then called me and said "I don't want to fill up a rehab bed for a patient that just needs speech,"* (ID18, Acute), when discussing the challenges in implementing early therapy. In contrast, some multidisciplinary teams were reported to expect patients with aphasia to be seen "*every day*" for therapy (ID06, Rehab). One participant commented that the expectation to see acute patients for therapy 'as early as tolerated' was very clearly made by the stroke consultant, and that was the reason she implemented the recommended practice; "*The expectations are so much more, because rehab needs to start from day one… Expectations from the specialist*," (ID16, Acute).

(iii) Leadership: The absence or presence of leadership in implementing recommended practice behaviours was also reported as an influencing factor. For example, one participant reported a lack of leadership and resulting uncertainty in who was supposed to provide information to stroke patients within her team; "*It's a process that hasn't been refined yet, and we're not consistently doing it,"* (ID01, Acute/Rehab). However, another clinician stated that providing accessible information was seen as a "*vital*" part of the stroke service, led by the nursing staff (ID19, Acute/Rehab). When discussing the lack of formal collaborative goal

setting that occurred in her hospital, one participant stated, "*You know clinicians should write goals. No one does it. No one does it,"* (ID16, Acute).

6.4.3.4 Key Influencing Factor 4. *Knowledge.*

The domain' Knowledge' was reported as a key facilitator or key barrier for three of the recommended practice behaviours. Like the domain 'Beliefs about Consequences', 'Knowledge' influenced practice in different ways depending on the recommended practice and clinical setting. It was a key barrier for *Information Provision* (combination of settings), *Amount and Intensity of Therapy* (combination of settings), and *Conversation Partner Training* (rehabilitation setting), and also a key facilitator for *Information Provision* (rehabilitation setting) and *Amount and Intensity of Therapy* (rehabilitation setting). Within this domain, the themes related to (i) procedural knowledge, (ii) knowledge of the task environment, (iii) and theoretical knowledge.

(i) Procedural knowledge: Some clinicians working in combined acute and rehabilitation roles lacked procedural knowledge about how to perform certain guideline-recommended behaviours, such as modifying information to be 'aphasia-friendly'. This was exemplified by Participant 01: *"I wouldn't feel confident in putting something together without more of a guideline*," (ID01, Acute/Rehab). In contrast, rehabilitation clinicians reported they were familiar with how to modify information; "…*lots of white space, highlight the key words, short sentences, don't overcrowd the page it's just, like,* burned *in there* (referring to her brain)," (ID10, Rehab).

(ii) Knowledge of the task environment: In addition, there were reported barriers related to a lack of knowledge of the resources available for information provision and where to find them (the task environment) for some acute clinicians. "*They're quite hard to locate as well. I wouldn't even know how to access those network pamphlets. I'd have no idea*," (ID16, Acute). However, rehabilitation clinicians were more familiar with the resources available, for example, "*The handouts we've got are a fairly broad collection from all of the places that we've worked*," (ID10, Rehab).

(iii) Theoretical knowledge: Speech pathologists working in a combination of settings reported a lack of familiarity with the recommendations; "*I wouldn't say that I'm intimately familiar with them (*referring to NSF recommendations)," (ID01, Acute/Rehab). In contrast, speech pathologists working in only the rehabilitation setting were more familiar with the underlying evidence; *"There's still evidence out there that providing that information at*

different points through the, you know, through the pathway and at different points in the recovery, is beneficial…" (ID10, Rehab). Speech pathologists working in rehabilitation were also more familiar with the theoretical knowledge for the *Amount and Intensity of Therapy* recommendations, for example, "… *the research says, the more, the better*…" (ID06, Rehab), compared to clinicians working in a combination of settings.

6.4.3.5 Key Influencing Factor 5. Beliefs about Capabilities.

'Beliefs about Capabilities' was a key facilitator and/or barrier for two of the recommended practice behaviours, influencing practice differently depending on the recommended practice and clinical setting. It was a key barrier for *Collaborative Goal Setting* for clinicians working in either rehabilitation or combined acute and rehabilitation roles, and *Timing of Therapy* for clinicians working in either acute or combined acute and rehabilitation roles. This domain was also a key facilitator for *Information Provision* in acute and rehabilitation settings, and *Timing of Therapy* in acute and a combination of acute and rehabilitation settings. Within this domain, the themes were (i) self-confidence and/or self-efficacy, (ii) empowerment, and (iii) perceived behavioural control.

(i) Self-confidence/Self-efficacy: Several clinicians reported a lack of self-confidence and self-efficacy in both *Collaborative Goal Setting* and *Timing of Therapy*. Many acknowledged that the goal-setting process was challenging, especially with people with severe aphasia or comprehension difficulties; "*It depends on the severity of the (…) person (with aphasia) that goal setting can be really challenging,"* (ID04, Acute/Rehab). Some clinicians reported low self-confidence about their capabilities in providing early therapy, for example, *"I personally feel like I'm not very good at rehab, because I have never been in a caseload where I've been able to do enough of it to get confident*," (ID01, Acute/Rehab). This was most commonly reported by clinicians who rarely engaged in this practice or were new graduates, with the implication that more experience led to increased confidence. One participant, who recently moved from a rehabilitation to an acute role, stated, "*I think when you're in it and when you're doing it all the time, you get a lot more confident. And then as soon as you step back, you sort of get out of the swing of it,*" (ID07, Acute).

(ii) Perceived behavioural control: This theme related to clinicians' perceived ability to overcome the challenges associated with implementing a practice behaviour. These challenges were sometimes related to the characteristics of the patient, or clinicians' caseload demands. For example, some clinicians reported that often patients were not engaged with the

goal-setting process, and unable to identify their own goals or concerns, which was a barrier to perceived behavioural control. This was exemplified by one participant, who stated, "*They (the patients) expect you to set the goals for them… because they've never actually taken ownership of their own health before. And they feel really vulnerable being in hospital, and they just want to be told what to do in many ways*," (ID01, Acute/Rehab). Other clinicians reported a lack of perceived control over whether they could provide education and information to people with receptive aphasia, given the patient's severity; "*It can be really tricky with people with receptive language deficits...that are quite severe*," (ID 03, Rehab).

(iii) Empowerment: In contrast, 'Beliefs about Capabilities' was a key facilitator for *Information Provision,* with many speech pathologists reporting adequate self-confidence, perceived behavioural control and empowerment. For example, one participant working in a rehabilitation setting reported she was "*fairly confident*" in providing information, and had created resources "*as necessary*", when there were no adequate resources available (ID06, Rehab). In addition, she reported she wasn't "*put off*" if families didn't want information, stating "*I just try and make them aware it's there it they want it*."

6.4.3.6 Key Influencing Factor 6. '*Goals.*'

The Theoretical Domains Framework domain 'Goals' was identified as a key facilitating factor for two behaviours: *Collaborative Goal Setting* and *Amount and Intensity of Therapy* in rehabilitation and combined acute/rehabilitation settings. The main themes within this domain were (i) goals and (ii) action planning.

(i) Goals: Several clinicians reported that it was a goal of their department to improve goal-setting procedures or to provide more intensive therapy. For example, goal setting was frequently reported to be a multidisciplinary team-based or individual goal *"(Goal setting is) something I'm working on*," (ID03, Rehab).

(ii) Action planning: There was also an awareness that some practice behaviours were areas for improvement, leading to action planning. When discussing intensive therapy, one participant stated, "… *I've got a lot of plans around structuring (therapy)*." (ID11, Acute/Rehab.)

6.4.3.7 Key Influencing Factor 7. 'Social/ Professional Role and Identity'.

The domain 'Social/ Professional Role and Identity' was identified as a key facilitating factor for two behaviours, *Timing of Therapy* in acute and combined settings, and

Amount and Intensity of Therapy in rehab and combined settings. Within this domain, the main themes were the need to (i) advocate for and (ii) provide core aphasia services.

(i) Role to advocate: Several clinicians believed it to be the speech pathologist's role to advocate for more intensive service delivery, sometimes questioning current policies and practices, for example, "*I say, "Why can't we go and see them every day?"* (ID08, Acute/Rehab).

(ii) Core service provision role: Many clinicians also described the belief that providing early therapy to patients with aphasia was a core part of their role, with one participant stating, *"I think it's a huge part of my role" (ID18, Acute).* This belief was echoed by another participant when discussing the provision of intensive aphasia therapy; *"It's our core business." (ID09, Rehab).*

6.5 Discussion

The aim of this research was to explore the barriers and facilitators that influence speech pathologists' use of evidence-based recommendations using the TDF in five priority areas of aphasia management: *Aphasia-Friendly Information Provision; Collaborative Goal Setting; Timing of Therapy; Amount and Intensity of Therapy;* and *Conversation Partner Training.* Seven key influencing factors were identified, with the TDF domains 'Environmental Context and Resources', 'Beliefs about Consequences' and 'Social Influences' emerging for all five practice behaviours. The other key factors of 'Knowledge', 'Beliefs about Capabilities', 'Goals' and 'Social/Professional Role and Identity', were key influencing factors for at least two of the practice behaviours investigated.

In particular, the *Environmental Context and Resources* domain was a key barrier for all behaviours. This is consistent with previous barriers research stating that factors such as a lack of appropriate resources (Hadely et al., 2014; Kenny & Lincoln, 2012; Power, Godecke, O'Halloran, & Worrall, 2012), time constraints (Hadely et al., 2014; Klippi, Sellman, Heikkinen, & Laine, 2012; O'Connor & Pettigrew, 2009), competing caseload demands (Kenny & Lincoln, 2012; Rose et al., 2013), and noisy environments (Rose et al., 2013) are barriers to evidence-based speech pathology practice.

In our study, speech pathologists working in the acute setting or in a combination of settings reported a high number of barriers and reported being less consistent in implementing guideline-recommended behaviours in their current practice than clinicians

working solely in inpatient rehabilitation. For clinicians working in the acute setting, a particular environmental barrier was the impact of the dysphagia (swallowing) caseload and their ability (or lack thereof) to prioritise aphasia management practices. This is consistent with a recent survey reporting that competing caseloads is one of the main barriers to providing aphasia management by acute speech pathologists, whose caseloads are usually dominated by dysphagia (Rose et al., 2013). These conflicting caseload priorities may have the potential to cause job dissatisfaction, with some researchers arguing that there is professional discord between desired service delivery and actual practice (Byng, 2002). Greener and Grant (1998) suggested that speech pathologists' morale was low, and that they, "*…feel the service they provide to people with aphasia is adversely affected by the increasing demands made on the service by those with dysphagia*," (p. 2). More recently, speech pathologists have reiterated the challenges of providing acute aphasia management, stating "*I feel we could be doing much more at the acute level*" (Rose et al., 2013), and that communication is taking a "back seat" (Foster et al, 2016).

Although 'Environmental Context and Resources' was a key barrier, it did not appear to prevent implementation of recommended practice in many instances. Despite reported environmental barriers, the majority of clinicians working in rehabilitation-only roles were reportedly able to consistently meet the guideline recommendations. Although it is difficult to say with certainty why the rehabilitation clinicians were able to overcome the environmental barriers they experienced, it could be due to the different structure of their caseload and their ability to plan service delivery more than those working in the acute setting, or simply due to an absence of any other major barrier. Alternatively, it could be due to rehabilitation clinicians' generally positive (i.e., facilitating) 'Beliefs about Consequences' and 'Social Influences', which are further discussed below. Perhaps, then, the other influencing factors can 'outweigh' this domain, or counteract its effect. This phenomenon needs further exploration.

Findings from our study indicate that speech pathologists' 'Beliefs about Consequences' and 'Social Influences' were highly influential on their aphasia management practices. This is in keeping with recent research showing that 'Beliefs about Consequences' and 'Social Influences' were two key factors influencing acute stroke unit team's assessment and referral practices for rehabilitation (Lynch et al, 2016). In our study, acute speech pathologists had mixed beliefs about the consequences of several aspects of management

(i.e., *Collaborative Goal Setting*, and *Amount and Intensity of Therapy*), and reported negative social influences for *Aphasia-Friendly Information Provision*. Speech pathologists working in acute settings reported positive social influences for only one aphasia practice, *Timing of Therapy*. In contrast, 'Beliefs about Consequences' was a facilitator for rehabilitation clinicians for *all* behaviours, and positive 'Social influences' were reported as facilitators for three behaviours. It is possible that, for acute clinicians, these negative beliefs are related to the finding that they performed the majority of behaviours inconsistently; acute speech pathologists simply may not have had the experience of seeing the benefits for themselves. Not only does this finding highlight the implementation challenges unique to the acute setting, as shown in a previous implementation study in aphasia (Simmons-Mackie et al., 2007), but also the importance of clinical context on implementation more generally.

'Beliefs about Capabilities' were identified both as a barrier and facilitator for acute clinicians in providing early therapy, with a sense of clinicians wanting to 'do more', whilst acknowledging the constraints of their workload. This finding is consistent with the work of Foster and colleagues (Foster, Worrall, Rose, & O' Halloran, 2015) who found that many acute clinicians felt disempowered to provide evidence-based aphasia management, despite their desire to do so. The often limited time that acute clinicians are able to allocate to aphasia assessment and management may also have flow-on effects on skill level and confidence with providing aphasia therapy. Some clinicians now believe that, while once the standard caseload for speech pathologists working with adults, aphasia management requires specialist skills (Power et al., 2012).

However, while individual clinicians reported a lack of skills and knowledge in certain areas, overall the domain 'Skills' (which encompasses the subdomain, or construct, Experience) was not a key factor influencing implementation of any of the behaviours investigated, and 'Knowledge' was a barrier for only two behaviours. This contrasts with recent findings from McCluskey and colleagues, who found that 'Skills' and 'Knowledge' were key barriers for speech pathologists in implementing stroke guidelines (McCluskey, Vratsistas-Curto, & Schurr, 2013). However, it should be noted that there were only two speech pathologists included in McCluskey and colleagues' (2013) study of 28 allied health professionals.

This study is the first known speech pathology study to use the TDF to explore barriers and facilitators for aphasia guideline implementation. The use of a theoretical

framework to guide interview topic guide and analysis is a strength of this study. In addition, the sample of speech pathologists included a variety of demographic considerations and adds to the richness of the data.

A limitation to this study is the fact that one researcher conducted all the interviews and led the analysis, however measures were put in place to ensure rigour, including having the whole research team agree upon a coding frame together, and independent peer code checking of a sample of transcripts. While providing rich data on barriers and facilitators to guideline-recommended behaviours, the findings represent a 'snapshot' in time, and could change depending on many factors (e.g., increased staffing, extra training) and the local context of the implementation efforts (Graham et al., 2006). As this is a qualitative study, the identified influencing factors are the views of the clinicians interviewed and therefore do not provide evidence of the actual influences on practice (Patey, Islam, Francis, Bryson, & Grimshaw, 2012).

Future research could examine whether a tailored implementation intervention based on the barriers and facilitators identified in this research is effective. In addition, it is worth examining whether nationwide support for speech pathologists who seek to implement evidence-based practices can improve the uptake of best practice recommendations and indeed, better quality of care and outcomes for people with aphasia.

6.6 Implications & Conclusion

Using the Theoretical Domains Framework, factors perceived to influence speech pathologists' guideline-recommended aphasia management practices were identified. The domains *Environmental Context and Resources*, *Beliefs about Consequences* and *Social Influences* were common factors for all behaviours investigated. Other key influencing factors included 'Knowledge', 'Beliefs about Capabilities', 'Goals' and 'Social/Professional Role and Identity', which influenced different practice behaviours in different ways (i.e., were either barriers or facilitators depending on the practice). This adds to current literature and could help in the development of a tailored implementation intervention aimed at improving speech pathologists' aphasia management practices. Importantly, implementation interventions need to account for the strong influence of beliefs and social influences on speech pathology practice, which may facilitate successful implementation and overcome environmental and contextual barriers.

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Chapter 7: The Acute Aphasia Implementation Study (AAIMS): A Pilot Cluster Randomised Controlled Trial.

In the previous chapter, key factors influencing speech pathologists' practice in five areas of aphasia management were identified. In Chapter 7, the design and delivery of a theory-informed behaviour change intervention will be reported.

The design of this study was a pilot cluster randomised controlled trial, which compared two behaviour change interventions that each targeted implementation of one of the practice behaviours investigated in Chapter 6. For this pilot study, we selected areas where we had existing resources and expertise within the research team for the two target behaviours for this study. Thus, the topics *Information, Education, and Aphasia-Friendly Information*, and *Collaborative Goal Setting* were selected.

The methodology for this study built on the findings of the literature reviews in Chapters 2 and 3, which provided support for a theory-informed approach to address known barriers and to design interventions. Therefore, the implementation intervention was designed to address the domains of the Theoretical Domains Framework (TDF) that were found to be barriers to implementation in Chapter 6. The literature review also informed the selection of outcome measures, which advocated for outcome measures beyond self-report and promoted endeavours to measure which aspects of the intervention resulted in behaviour change. Therefore, medical record audits were used as the primary outcome measure, with a secondary outcome measure consisting of a survey based on the TDF to measure whether barriers were addressed.

However, as stated in Chapter 2 (Sections 2.4.4 and 2.5.3), the TDF provides little guidance on how to develop behaviour change interventions. Therefore, the Behaviour Change Wheel was used to design the intervention, as the BCW authors provide clear direction on how to develop a behaviour change intervention that can be clearly linked to behaviour change techniques. This is further described in the methods section of this chapter. It should be noted that the BCW was only used for the intervention design component of this study.

The aim of this study was to design and test the feasibility, acceptability and potential effectiveness of a tailored implementation strategy to improve speech pathologists' uptake of evidence in one of two areas of practice in the acute hospital setting. We also investigated the effect of the implementation strategies on the hypothesised barriers to change. Furthermore, it was hypothesised

that a tailored implementation strategy would change clinician behaviour in the area in which the intervention was received and have no effect on the behaviour not targeted, thus attributing the behaviour change to the implementation intervention.

7.1 Abstract

Background: There is considerable variation in aphasia management practices across the continuum of care. Australian speech pathologists working in the acute setting have reported more barriers to implementing guideline recommendations for aphasia than those working in inpatient rehabilitation settings, with acute speech pathologists performing some behaviours inconsistently or rarely. For speech pathologists to implement best practice recommendations consistently in acute care, there is the need to change their clinical practice behaviours. However, little is known about the effectiveness of behaviour-change strategies in speech pathologists providing acute aphasia management. Hence, the aim of this study was to design and test the feasibility, acceptability and potential effectiveness of a tailored implementation strategy to improve acute speech pathologists' uptake of evidence in two areas of practice, *Aphasia-friendly Information Provision* and *Collaborative Goal Setting*.

Methods: A pilot cluster randomised controlled trial was used. Clusters were speech pathology departments within hospitals, with four clusters allocated to receive either Intervention A (targeted at improving Information Provision) or Intervention B (targeted at improving Goal Setting). There were two clusters in each arm of the study. An implementation intervention was designed to address the known barriers for each intervention arm. Both interventions included a face-to-face workshop incorporating behaviour-change techniques such as education, persuasion, enablement and environmental restructuring. Outcomes measures were utilised to address the research questions of feasibility (e.g, treatment fidelity and retention of participants), acceptability (e.g., post-study focus groups) and potential effectiveness (e.g., medical record audits and behaviour construct surveys). The quantitative data was recorded at baseline and 3-6 month follow-up, allowing for change scores to be calculated. In addition, data was also collected for each cluster's non-targeted behaviour (the behaviour that was not targeted by the intervention), to provide a control measure.

Results: All four clusters completed the study, with a total of 37 speech pathologists participating. The majority of participants were female (36/37 = 97.3%), entry-level clinicians (15/37 = 40.5%), with a mean age of 30 years. Medical record data from 107 patients were included in the statistical analysis (post-intervention n = 61; information provision intervention n = 36, goal setting intervention n = 25). Overall, there was a significant improvement in the target behaviour for Intervention A (*Aphasia-friendly Information Provision*; mean improvement 52.78%, $p = 0.001$),

but a small non-significant change in the target behaviour for Intervention B (*Collaborative Goal Setting*; 8.46%, $p = 0.406$). There were potentially significant changes seen in several, but not all, of the domains targeted by the interventions (e.g., Knowledge ($p = 0.014$), Beliefs about Capabilities ($p = 0.032$), and Environmental Context and Resources ($p = 0.000$) for Intervention A), and no changes seen in any of the non-targeted domains, with the exception of Skills. Barriers and enablers to implementation were reported by participants in all clusters.

Discussion and Conclusion: This study demonstrated that a tailored implementation intervention targeting acute speech pathologist's aphasia management practices was feasible to deliver and acceptable for most participants. In addition, the interventions were potentially effective, showing significant improvements in the information provision behaviour targeted by Intervention A. However, goal setting did not significantly improve, and there were more barriers identified by the participants for implementing this behaviour. It was possible to partially explain the mechanisms of behaviour change that occurred during the study, however this needs to be addressed further in future studies.

7.2 Introduction

Despite the availability of high quality clinical practice guidelines (e.g., National Institute for Health and Care Excellence, 2013; National Stroke Foundation, 2010) and best practice statements (e.g., Australian aphasia rehabilitation best practice statements, Power et al., 2015), evidence-practice gaps have been identified in almost all areas of aphasia management. For example, a rehabilitation audit (Hubbard et al., 2012) found only 58% adherence to the aphasia recommendations (such as provision of aphasia-friendly information, and provision of recommended therapy approaches) in the Australian Clinical Guidelines for Stroke Management (National Stroke Foundation, 2010). Effective implementation strategies to improve speech pathologists' aphasia management practices are needed.

It is generally accepted that the selection of implementation interventions should be based on a tailored approach (Baker et al., 2015; Baker et al., 2010). That is, interventions should be tailored to the underlying barriers to implementation. Tailored interventions are more effective than non-tailored interventions or passive guideline dissemination in producing behaviour change (Baker et al., 2010). However, there is insufficient evidence on how to identify barriers, how to identify the most important barriers to target in an intervention, and whether barriers are actually addressed by a chosen intervention (Baker et al., 2015). Therefore, to further this understanding, it is important that efforts are made to understand why and how practice change occurred.

To date, only four studies evaluating the effect of implementation strategies on aphasia management have been published. These studies all focused on improving communicative access for people with aphasia, and evaluated the effectiveness of providing staff training in supported conversation techniques (Horton, Clark, Barton, Lane, & Pomeroy, 2016; Jensen et al., 2014; Simmons-Mackie et al., 2007; Wielaert, Van de Sandt-Koenderman, Dammers, & Sage, 2016). A Canadian (Simmons-Mackie et al., 2007) qualitative study was conducted in three different settings (acute, rehabilitation, and long-term care), and implemented a team-based intervention to improve communicative access for people with aphasia. The intervention used a multifaceted approach, including educational outreach visits and some tailoring of training to individual teams, with on-site support and follow-up. However, it is not clear how tailoring was achieved, and barriers were not identified prior to commencing the study. Professional outcomes (e.g., knowledge and confidence) were measured by qualitative methods including observation, focus groups, and open-ended interviews. Although all teams initially showed improved knowledge and understanding of communicative access, only the rehabilitation and long-term care teams achieved their communicative access improvement goals at follow-up. The acute care team reported more barriers

to change, and less success in implementation. While participants reported examples of increased participation of people with aphasia, there were no quantitative measures verifying these reports. Additionally, barriers to behaviour change were not identified prior to the intervention, and no theory or model of behaviour change was used.

A Danish implementation study (Jensen et al., 2014) used a mixed methods design to improve communicative access for people with aphasia in a hospital stroke unit by training healthcare professionals in communication partner training. The implementation intervention involved educational meetings and the development of local consensus processes. Although 105 multidisciplinary team-members were trained, including doctors, physiotherapists, occupational therapists and speech pathologists, only the outcomes for the nursing staff were reported in the paper. There was no theoretical basis for the intervention described, and the implementation was not tailored to identified barriers. While the authors reported positive outcomes based on interview and questionnaire responses, such as improved knowledge of aphasia and improved communication experiences with this population, there were no quantitative measures of behaviour change included in the study.

A similar study, which used a cluster controlled feasibility design, was conducted in the UK (Horton et al., 2016; Horton, Lane, & Shiggins, 2015) and involved training allied health and nursing staff working in a rehabilitation unit in using supported conversation techniques with people with aphasia. Barriers to implementation were not prospectively identified and no theoretical basis for the selection of their intervention techniques was reported. The study included only one speech pathologist (of 28 professionals who received training), so the results may not be generalisable to speech pathology practice. The outcome measures were predominantly based on self-report (i.e., focus groups, interviews, and learning logs), but also included observations of interactions between health professionals and people with aphasia, rated by blinded independent assessors. However, as there was no pre-intervention comparison, the videoed interactions could not be used to show change in the health professional's behaviour. While the authors reported the model of implementation had benefits, including improved staff confidence in communication, many implementation barriers were identified, including patient factors, time and environmental resource constraints.

The final implementation study in aphasia was a qualitative before and after study conducted in the Netherlands (Wielaert et al., 2016). This study focussed on implementing a conversation partner training program in ten rehabilitation centres. Two speech pathologists from each centre receiving training in the program and then acted as a Knowledge Broker for their team. The theory-

based implementation strategy included educational meetings, local opinion leaders, and the development of local care pathways. However, the implementation strategy was not tailored to prospectively identified barriers. Quantitative results were based on recruitment rates of people with aphasia and their carers into the program, with seven of the centres meeting their recruitment targets, indicating partial implementation success for these centres. However, as only one centre had developed a care pathway that included the conversation partner training program, the authors proposed that the program may not have been completely embedded into usual practice. Questionnaire responses from participating clinicians identified several barriers to implementation, including a lack of time and leadership, and a lack of suitable clients. As there was no baseline measure or control group, it is unclear how the implementation strategies resulted in behaviour change.

The evidence-base for implementation in aphasia management is still developing, and is bound by methodological limitations that restrict our ability to attribute effects to the interventions tested. Although these studies showed some positive findings, outcome measures of practitioner behaviour change were predominantly based on self-report or only occurred post-intervention. Therefore it is not certain whether actual change in clinical practice occurred, or *how* it occurred, in any of these studies. In addition, two of these studies did not report any outcome data for speech pathologists (Horton et al, 2016; Jensen et al., 2014), and are therefore have limited ability to explain whether, or how, they were able to bring about specific practice changes for speech pathologists. Three of the aforementioned studies lacked any reported theoretical basis for the selection of their intervention techniques (Horton et al, 2016; Jensen et al., 2014; Simmons-Mackie et al., 2007), and none of them prospectively designed the intervention to address known barriers to implementation.

The Theoretical Domains Framework (TDF) is one framework that can be used both to identify barriers to change and to design tailored behaviour-change interventions (Michie et al., 2005). The TDF has 14 theoretical domains which are based on the synthesis of 33 behaviour-change theories and 128 key theoretical constructs (Cane, O'Connor, & Michie, 2012). Each of the 14 domains has its own definition and a number of theoretical constructs within it – examples of these definitions can be found in Table 7-1. The TDF has been used in many areas of healthcare to identify barriers and facilitators to evidence uptake (Alexander, Brijnath, & Mazza, 2014; Murphy et al., 2014), and to guide the development of behaviour change interventions (Atkins et al., 2017; French et al., 2012; Tavender et al., 2015). As the TDF is based on a clear framework, it enables researchers to identify and design interventions systematically, allowing for clear rationales of

research methodology and potentially replicable results (Francis, O'Connor, & Curran, 2012; French et al., 2012). The TDF has been shown to be useful in both understanding the barriers to behaviour change and in designing successful behaviour change interventions (Duncan et al., 2012; Dyson, Lawton, Jackson, & Cheater, 2010).

The Behaviour Change Wheel (BCW) is another framework designed to assist in the selection and design of behaviour change interventions (Michie, Stralen, & West, 2011). At the centre of the BCW is the COM-B (Capability, Opportunity, Motivation and Behaviour) hub, representing a synthesis of behaviour-change theories. The COM-B purports that motivation, capability and opportunity are all necessary conditions for a volitional behaviour to occur; they can influence behaviour, and behaviour can, in turn, alter capability, motivation and opportunity (Michie, Atkins, & West, 2014). Each domain of the TDF relates to a COM-B component, therefore the two frameworks can be used in parallel. The BCW's process of intervention selection is linked to the *Behaviour Change Taxonomy* which includes 93 behaviour change techniques (Michie et al., 2013). Although the BCW is a relatively new way of conceptualising the numerous behaviour change theories available, it has been used to design successful behaviour change interventions (Handley et al., 2016; Mc Sharry, Murphy, & Byrne, 2016), and to determine effective components of behaviour change interventions retrospectively (Chauhan et al., 2017).

Three studies have identified the barriers to performing guideline-recommended aphasia management practices by speech pathologists. In our recent interview-based study, we used the TDF to identify the key factors influencing five areas of practice (Shrubsole, Worrall, Power, & O'Connor, 2018). For all five practice areas that we investigated - *Timing of Therapy; Amount and Intensity of Therapy; Goal Setting; Information, Education and Aphasia-friendly Information*; and *Conversation Partner Training* - the TDF domains of 'Environmental Context and Resources', 'Beliefs about Consequences', and 'Social Influences', were identified as key influencing factors. For example, in the domain 'Environmental Context and Resources', participants reported specific barriers related to: competing caseload demands - whereby dysphagia (swallowing) referrals were often a priority; difficulty accessing the patient – due to the patient undergoing other medical tests or treatment; and the organisational culture - which was often focussed on short length of stay and quick discharge dates. 'Beliefs about Consequences' barriers included a lack of belief in the benefit or effectiveness about some aphasia management practices, and 'Social Influences' barriers included a lack of expectation from patients, family and colleagues that recommended practices would occur. In addition, we found that clinicians working in the acute setting performed the majority of recommended behaviours inconsistently or rarely, and reported a greater number of

barriers than clinicians working in a rehabilitation setting. Environmental constraints specific to the acute setting were reported, particularly that clinical priority was given to new referrals with dysphagia, often preventing patients with aphasia from being seen. Similar findings have been reported elsewhere, where acute clinicians report the negative impact of competing demands (Rose, Ferguson, Power, Togher, & Worrall, 2013), and where the acute team reported less success in implementation, and identified more barriers to change (Simmons-Mackie et al., 2007). As such, clinicians working in the acute setting may benefit more from an implementation intervention than rehabilitation clinicians who report fewer barriers and greater consistency in their practice.

With this new knowledge of the barriers to implementation, a tailored, theory-informed behaviour change intervention can be developed, aimed at improving speech pathologists' aphasia management practices. Therefore, this study aimed to:

1. Design and test the feasibility, acceptability and potential effectiveness of a tailored implementation strategy to improve speech pathologists' uptake of evidence in one of two areas of practice in the acute hospital setting (Intervention A = *Aphasia-friendly information provision*, Intervention B = *Collaborative Goal Setting*); and

2. Investigate the effect of the implementation strategies on the hypothesised predictors of clinician behaviour (the barriers to change).

It was hypothesised that a tailored implementation strategy would change clinician behaviour in the area in which the intervention was received (i.e. information provision or goal-setting) and have no effect on the behaviour not targeted, illustrated in Figure 7.1.

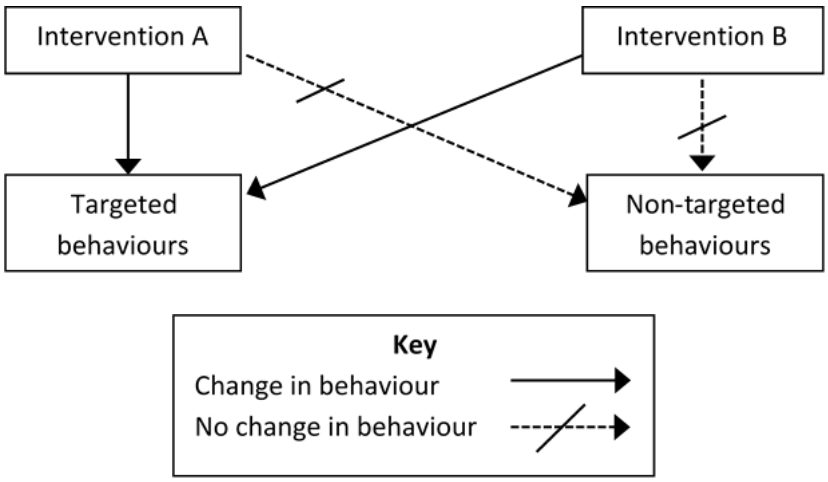

Figure 7-1. Study Design and Hypothesised Behaviour Changes

7.3 Methods

7.3.1 *Design*

This was a Phase I pilot feasibility trial (Eldridge et al., 2016) using a cluster randomised controlled trial design. The UK Medical Research Council recommends testing complex interventions such as this for feasibility, acceptability and potential effectiveness prior to full testing (Craig et al., 2008). In our study, *feasibility* referred to the practicality and logistics of conducting the research as perceived by the research team, indicated by recruitment retention, data collection methods, the ease with which the elements of the pilot study were conducted (e.g., organising the workshop) and treatment fidelity. *Acceptability* related to the participants' satisfaction with the implementation intervention as a means of addressing the guideline recommendations, including aspects of study participation such as data collection. *Potential effectiveness* related to the capacity of the implementation intervention to produce change as measured by the quantitative outcome measures and the participants' perceptions (Craig et al., 2008; Eldridge et al., 2016).

The crossover design nested within the cluster RCT used non-targeted behaviours as control outcome measures. This deign allowed us to trial implementation of two recommended aphasia practice areas and collect twice the amount of data on its potential effectiveness. Both interventions were therefore used as the experimental arm and attention control arm of the study.

7.3.2 *Participants*

Clusters were speech pathology departments within hospitals. Speech pathology teams from acute hospitals from either Queensland or New South Wales, Australia, were eligible to participate if there was at least one speech pathologist providing management to people with post-stroke aphasia on the acute wards, each team had seen at least 10 people with aphasia in the previous three months, and there was evidence of room for improvement in the baseline file audit (mean performance ≤ 70%).

Speech pathology teams were recruited through the following sources: the Clinical Centre for Research Excellence (CCRE) Aphasia mailing list, a voluntary mailing list that includes clinicians who have a special interest in aphasia; the Speech Pathology Email Chat (SPECs) group, a special interest group for speech pathologists working with adult caseloads across Australia; and the Leaders in Speech Pathology (LiSP) mailing list for department managers of Queensland Health Speech Pathology Departments. In all instances, once potential participants had expressed interest by email, the researcher contacted them by telephone to describe the project further, to determine eligibility for participating in the study, and to ascertain whether they would like to participate.

Sites were randomised using a random integer set generator to receive either intervention A or B, with two sites randomised to each arm. Randomisation occurred after baseline file audits of 10 aphasia patients' files. The file audit recorded whether, during the patient's acute hospital admission, the speech pathologist had stated in a patient's file that information had been provided to either the person with aphasia or their friends and family, and whether goal setting was conducted. Sites were not informed of the focus of the other intervention arm of the study.

Ethical approval (HREC/16/QPAH/52 – see Appendix D-1) was obtained for individual participant speech pathologists and did not include patients, therefore no identifying patient information was recorded as part of the study. For the reporting of this study, The Template for Intervention Description and Replication (TIDieR) checklist (Hoffmann et al., 2014, see Appendix D-2) and the Standards for Reporting Implementation Studies (StaRI) (Pinnock et al., 2017, see Appendix D-3) have been adhered to, in addition to the Consolidated Standards of Reporting Trials (CONSORT) statement's extension for cluster randomised trials (Campbell, Piaggio, Elbourne, & Altman, 2012).

7.3.3 *Procedure and Interventions:*

Selection of Target Behaviours: The practice area selected as the target behaviour for Intervention A was *Aphasia-Friendly Information Provision.* This was selected as it had previously been identified as an important implementation priority (Shrubsole, Worrall, Power, & O'Connor, 2017), and there was existing evidence of barriers to implementation by acute speech pathologists (Shrubsole, Worrall, Power, & O'Connor, 2018). For the purposes of this study, the information provision behaviour was defined as follows: "In the acute setting, speech pathologists will provide people with aphasia and their families with written information tailored to meet their needs in an aphasia-friendly format."

The practice area selected as the target behaviour for Intervention B of the study was *Collaborative Goal Setting*, defined as follows: "In the acute setting, speech pathologists will collaboratively set goals with people with aphasia and their families that are prescribed, specific and challenging." This behaviour met the same criteria as the Intervention A behaviour - that is, a behaviour of priority for implementation with evidence of known barriers. We also selected this behaviour in order to create an element of attention control, so that we could compare the outcomes of the two implementation interventions, and maximise the efficiency of the data obtained.

Therefore, each arm of the study measured both targeted and non-targeted behaviours as outcomes, and within each study arm the non-targeted behaviour acted as a control measure.

Design of the Implementation Interventions: Multifaceted implementation interventions were designed to target previously identified barriers that were mapped to the Behaviour Change Wheel (Michie et al., 2014). For Intervention A (*Information Provision)*, these barriers were: Knowledge, Beliefs about Capabilities, Beliefs about Consequences, Social Influences, and Environmental Context and Resources (Shrubsole et al, 2018). For Intervention B (*Goal Setting)*, these barriers were the same but without Knowledge as a barrier (Shrubsole et al, 2018). Definitions of these TDF domains and examples of the specific barriers are presented in Table 7-1. Intervention functions and behaviour change techniques were selected after mapping the identified barriers as per processes recommended by the Behaviour Change Wheel authors (Michie et al., 2014). Firstly, intervention functions were identified using the APEASE (Acceptability, Practicability, Effectiveness/cost-effectiveness, Affordability, Safety/side-effects, Equity) criteria. The selection of intervention functions for the goal setting behaviour is provided as an example in Appendix D-4. For each intervention function, specific behaviour change techniques (BCTs) were selected from the *Behaviour Change Techniques Taxonomy* (v1) (Michie et al, 2013), giving consideration to the APEASE criteria and the appropriateness of the BCT for each intervention function with guidance from the BCW authors regarding the most frequently used BCTs (see Table 3.3 of Michie et al., 2014). The behaviour change techniques used in each intervention are outlined in Table 7-2, along with the targeted domains of the TDF and the components of each intervention. In order to develop the final intervention strategy, the mode of delivery was also considered. When determining the mode of delivery, an educational workshop was chosen as, a) this is part of routine educational practice in speech pathology within Australia, and b) educational interventions are a standard method of delivery in implementation studies (Scott et al, 2012). In this way, the implementation intervention could be embedded into an already familiar and accepted method of furthering professional development. A one-off workshop was chosen in consultation with the managers of participating clusters, to encourage maximum participation from team members and to reduce their time spent away from direct patient care. Other potential delivery methods such as academic detailing were not considered feasible by the sites nor the research team due to resource constraints. Thus, the intervention was developed into a single educational workshop that was designed to be delivered face-to-face by a member of the research team.

Table 7-1. Definitions of Domains and Examples

Domain	**Definition** *(as per Cane, O'Connor, & Michie, 2012)*	**Examples of Barriers** *(from Shrubsole et al, 2018)*	
		Information Provision	**Goal Setting**
Knowledge	An awareness of the existence of something. *Constructs include:* Knowledge (including knowledge of condition /scientific rationale) Procedural knowledge Knowledge of task environment	• Unaware of how to modify information • Unaware of what resources available and location of these • Lack of familiarity with recommendations	*Not applicable*
Beliefs about Capabilities	Acceptance of the truth, reality, or validity about an ability, talent, or facility that a person can put to constructive use. *Constructs include:* Self-confidence Perceived competence Self-efficacy Perceived behavioural control Beliefs Self-esteem Empowerment Professional confidence	• Lack of confidence in developing aphasia-friendly materials • Lack of confidence in labelling 'aphasia' in acute setting • Challenges in providing information to people with severe aphasia	• Lack of self-confidence in engaging in collaborative goal setting • Lack of perceived behavioural control as many patients not engaged in process • Challenges in goal setting with people with severe or receptive aphasia
Beliefs about Consequences	Acceptance of the truth, reality, or validity about outcomes of a behaviour in a given situation. *Constructs include:* Beliefs Outcome expectancies Anticipated regret Consequents	• Belief that patients are too overwhelmed to receive information in acute setting • Belief that patients will not remember information in acute setting	• Belief that it is too early to think about goals in acute setting • Belief that some patients will improve without goals
Social Influences	Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviours. *Constructs include:* Social pressure Social norms Group conformity Social comparisons Alienation Group identity Modelling	• PwA do not always expect/desire information • Lack of leadership amongst MDT in providing stroke information	• PwA and families do not always expect or want to be involved in goal setting • Lack of leadership amongst MDT in engaging in goal setting • Lack of expectation from MDT that goal setting will occur

Domain	Definition *(as per Cane, O'Connor, & Michie, 2012)*	Examples of Barriers *(from Shrubsole et al, 2018)*	
		Information Provision	**Goal Setting**
Environmental Context and Resources	Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behaviour *Constructs include:* Environmental stressors Resources / material resources Organisational culture /climate Salient events / critical incidents Person x environment interaction Barriers and facilitators	• Lack of appropriate pre-packaged resources in acute setting • Difficult to access the patient in the acute setting due to other professions/tests • Lack of time to develop aphasia-friendly resources • Difficult to access the patient's family	• Lack of appropriate and specific resources for acute setting • Difficult to access the patient in the acute setting due to other professions or tests • Lack of time to engage in goal setting • Difficult to access the patient's family to assist in process of goal setting

- Intervention A: Intervention A included intervention functions aimed at addressing the known barriers to the target behaviour (*Information Provision*), including education, persuasion, environmental restructuring, modelling and enablement. These functions incorporated several BCTs, as shown in Table 7-2, that were used in the following ways:

  - Education - Education about the target behaviour (information provision only) to increase knowledge and understanding about the key evidence underlying the guideline recommendations, how to modify information to meet patient and family needs, and resources available. Feedback of each cluster's own baseline audits was also provided.

  - Persuasion – Persuasive communication was used to motivate increased information provision. A video was presented of a person with aphasia and a family member discussing the importance of receiving information about aphasia from their therapist and how they would have liked to receive this information (using persuasive language). The researchers also presented case studies of people with aphasia who reported improved outcomes after receiving information.

  - Environmental restructuring - Teams were provided with resources to help change the physical environment and increase the information provision behaviour. This included a newly-developed interactive PDF information package (called 'What's happening to me now?', see Appendix D-5), and instructions to support the package. Written protocols were provided in order to assist the participants embed the enhanced information package into their departments, as well as opportunities for discussion and action planning.

- Modelling – Use of the information package was explained and modelled by the researchers using different case examples. Following this, experiential learning opportunities were created to impart skills and participants practiced and observed each other using the various information resources in role-play scenarios.
- Enablement – The workshop was interactive and promoted discussion, with teams asked to identify barriers and strategies to implement better information provision throughout. At the completion of each workshop, teams were asked to identify a goal for their implementation phase, and brainstorm strategies for success.

- Intervention B: This intervention included intervention functions aimed at addressing the known barriers to this behaviour including education, persuasion, environmental restructuring, modelling and enablement. Details of this intervention can be found in Table 7-2.

Delivery of the Implementation Interventions: Interventions were delivered to all clusters by author KS, an experienced clinical speech pathologist, and one other author (either EP or LW, both experienced speech pathologists and researchers) between September and October 2016. The two clusters allocated to Intervention A received a single, face-to-face, two-and-a-half hour interactive education session and workshop. Teams allocated to the Intervention B received an intervention of comparable length and format, targeting the implementation of collaborative goal setting with people with aphasia. The definitions of the target behaviours were explored, discussed and refined by the participating clusters within each workshop. For example, Cluster 2 decided that the information provision behaviour included providing verbal and written aphasia-friendly information to each patient with aphasia at least once during their acute admission. The written information would vary depending on the person's communication needs, as decided by the clinician after taking into account the severity of the patient's aphasia. Although the definition of the practice behaviour was refined by each cluster, the outcome measures used the original definitions (see 7.3.3 Selection of Target Behaviours) for consistency of measurement across all clusters.

Implementation Phase: Following the implementation workshop, each cluster selected a date to commence implementation of the recommended practices. Clusters then implemented the target behaviour and completed data collection (i.e. case encounter forms – described below) for a minimum period of 12 weeks, or longer if there were less than 10 eligible cases in this period, up to a maximum of 24 weeks. The details of each phase of the study are shown in Figure 7-2.

Table 7-2. Intervention Components and Hypothesised Predictors of Behaviour

Intervention	Target Behaviour	Hypothesised Predictors of Behaviour Targeted by Intervention Component	Components of Intervention and Intervention Functions	Behaviour Change Techniques (BCTs) Used (Labels from the BCT Taxonomy)
Information Provision (A)	"***In the acute setting, speech pathologists will provide people with aphasia and their families with written information tailored to meet their needs in an aphasia-friendly format."***	Knowledge Beliefs about consequences Social influences	Powerpoint Presentation by study investigators included intervention functions of **Education** and **Persuasion**	Information about health consequences (5.1) Information about social and environmental consequences (5.3) Feedback on behaviour (2.2) Feedback on outcomes of behaviour (2.7) Salience of consequences (5.2) Verbal persuasion about capability (15.1) Framing/reframing (13.2) Focus on past success (15.3)
		Beliefs about consequences Social Influences	Video recording by consumer (person with aphasia) included intervention functions of **Persuasion** and **Enablement**	Credible source (9.1) Information about social and environmental consequences (5.3) Information about emotional consequences (5.6) Salience of consequences (5.2) Anticipated regret (5.5)
		Social influences Beliefs about capabilities Environmental context and Resources	Whole group discussion included intervention functions of **Enablement and Environmental Restructuring**. Participants reflected on their current practice and possible strategies to overcome barriers such as time/staffing etc. Brief problem-solving as a group.	Social support (3.1) Restructuring the social environment (12.2) Goal setting (behaviour) (1.1) Problem Solving (1.2) Action planning (1.4)
		Knowledge Environmental context and resources Beliefs about capabilities	Introduction and Demonstration of Packaged information resource (including online videos) included intervention functions of **Education, Modelling** and **Environmental Restructuring.**	Instruction on how to perform behaviour (4.1) Demonstration of the behaviour (6.1) Adding objects to the environment (12.5) Exposure (7.7) Prompts/cues (7.1)

Intervention	Target Behaviour	Hypothesised Predictors of Behaviour Targeted by Intervention Component	Components of Intervention and Intervention Functions	Behaviour Change Techniques (BCTs) Used (Labels from the BCT Taxonomy)
		Beliefs about capabilities	Skills demonstration – different severities/types of aphasia included intervention functions of **Education** and **Modelling** how to tailor information using packaged resource.	Instruction on how to perform behaviour (4.1) Demonstration of the behaviour (6.1)
		Beliefs about capabilities Social influences	Small group practical: included intervention functions of **Modelling** taking turns adapting resource, providing information in pairs and reflecting on the experience.	Demonstration of the behaviour (6.1) Self-monitoring of behaviour (2.3)
		Beliefs about capabilities Social influences	Reflection and Summary: Included intervention function of **Enablement,** involved interactive problem-solving and brainstorming strategies for success, and team-led goal setting.	Social support (3.1) Restructuring the social environment (12.2) Review behaviour goals (1.5) Problem Solving (1.2) Action planning (1.4) Verbal persuasion about capability (15.1) Behavioural contract (1.8)

Intervention	Target Behaviour	Hypothesised Predictors of Behaviour Targeted by Intervention Component	Components of Intervention and Intervention Functions	Behaviour Change Techniques (BCTs) Used (Labels from the BCT Taxonomy)
Collaborative Goal Setting (B)	"***In the acute setting, speech pathologists will collaboratively set goals with people with aphasia and their families that are prescribed, specific and challenging."***	Beliefs about capabilities Beliefs about consequences Social influences	PowerPoint Presentation by study investigators included intervention functions of **Education** and **Persuasion.**	Information about health consequences (5.1) Information about social and environmental consequences (5.3) Feedback on behaviour (2.2) Feedback on outcomes of behaviour (2.7) Salience of consequences (5.2) Verbal persuasion about capability (15.1) Framing/reframing (13.2) Focus on past success (15.3)
		Beliefs about consequences Social Influences	Video recording by consumer (person with aphasia) included intervention functions of **Persuasion** and **Enablement.**	Credible source (9.1) Information about social and environmental consequences (5.3) Information about emotional consequences (5.6) Salience of consequences (5.2) Anticipated regret (5.5)
		Social influences Beliefs about capabilities Environmental context and Resources	Whole group discussion included intervention functions of **Enablement and Environmental Restructuring**. Participants reflected on their current practice and possible strategies to overcome barriers. Brief problem-solving as a group.	Social support (3.1) Restructuring the social environment (12.2) Goal setting (behaviour) (1.1) Problem Solving (1.2) Action planning (1.4)
		Environmental context and resources Beliefs about capabilities	Introduction and Provision of goal-setting resources and frameworks included intervention functions of **Education, Modelling** and **Environmental Restructuring.**	Instruction on how to perform behaviour (4.1) Demonstration of the behaviour (6.1) Adding objects to the environment (12.5) Exposure (7.7) Prompts/cues (7.1)
		Beliefs about capabilities	Skills demonstration – with different severities/ types of aphasia included	Instruction on how to perform behaviour (4.1) Demonstration of the behaviour (6.1)

Intervention	Target Behaviour	Hypothesised Predictors of Behaviour Targeted by Intervention Component	Components of Intervention and Intervention Functions	Behaviour Change Techniques (BCTs) Used (Labels from the BCT Taxonomy)
			intervention functions of **Education** and **Modelling** how to engage in collaborative goal setting in acute setting.	
		Beliefs about capabilities Social influences	Small group practical: included intervention functions of **Modelling,** taking turns engaging in collaborative goal-setting process in pairs and reflecting on activity.	Demonstration of the behaviour (6.1) Self-monitoring of behaviour (2.3)
		Beliefs about capabilities Social influences	Reflection and Summary: included intervention functions of **Enablement,** involved problem-solving and brainstorming strategies for success, and team-led goal setting.	Social support (3.1) Restructuring the social environment (12.2) Review behaviour goals (1.5) Problem Solving (1.2) Action planning (1.4) Verbal persuasion about capability (15.1) Behavioural contract (1.8)

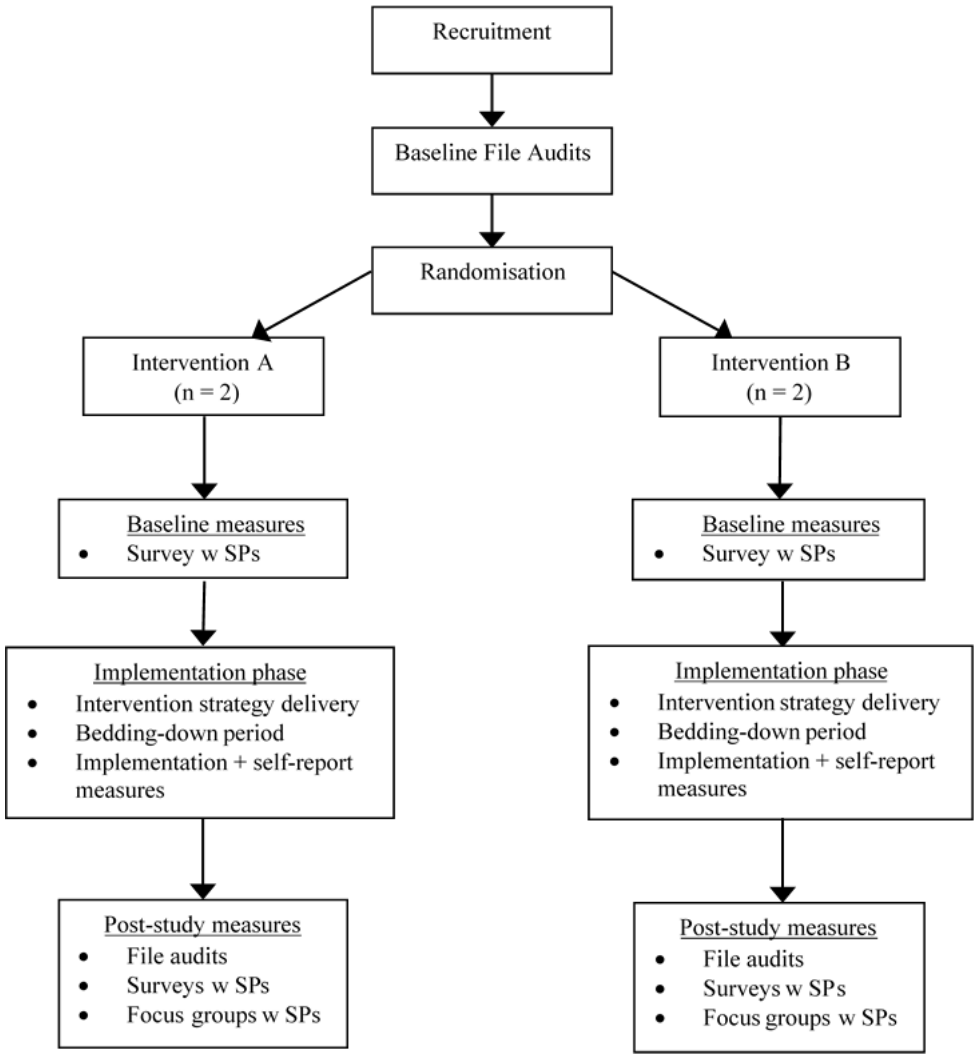

Figure 7-2. Outline of Study Procedure, Intervention Delivery and Data Collection

7.3.4 ***Outcome Measures***

A summary of the outcome measures used in this study is presented in Table 7-3. The primary outcome measure was the change in the targeted behaviour as determined by a medical record audit (see Appendix D-6). Hence, in Intervention A (*Information Provision)*, the hypothesis was that there would be an increase in the proportion of people with aphasia provided with a tailored information package in the acute phase, as documented in the medical file by participant speech pathology team-members during the 3-6 month post-intervention period compared to the 3-6 month baseline period. Medical records were audited by an independent speech pathologist in each cluster and blinded to group allocation. Audits occurred both before and approximately four months after delivery of the implementation intervention using identical procedures. Auditors received training in completing the medical record audits. Intra-rater reliability of the medical record audits was completed for 20% of the medical charts. Inclusion criteria for the medical records were broad and

included: patient admitted with new cerebral event or stroke, and the presence of aphasia was confirmed in the file by the treating speech pathologist.

Secondary outcome measure included:

1. **Case encounter checklist:** The behaviours recorded in this checklist (see Appendix D-7) provided more detailed information than that expected in the patient files and was used to determine whether targeted aphasia recommendations were completed by the speech pathologist independently of recording them in the patient's file. Speech pathologists in both arms completed the checklist for each encounter with a patient with aphasia. The behaviours on the checklist included both the targeted and non-targeted behaviours for both interventions, and included other unrelated behaviours relating to aphasia management, such as language assessment, so that it would not act as a prompt or reminder. The concordance between the post-implementation medical record audits and the checklist was also determined. Participants completed these checklists during the implementation phase.

2. **Behavioural constructs survey:** Participants in both arms of the study completed a behavioural constructs survey (see Appendix D-8) at baseline (prior to attending the workshop) and following completion of the implementation phase. The survey, based on the Theoretical Domains Framework, aimed to determine differences in hypothesised predictors of behaviour post-implementation and whether targeted barriers were successfully addressed by the interventions. The survey included both targeted and non-targeted behaviours (information provision and goal setting). It was disseminated online via SurveyMonkey (www.surveymonkey.com), with each cluster given a unique access point to the survey, to ensure that results were pooled to the correct cluster. When the survey was not completed online prior to the workshop, the workshop facilitator asked participants to complete a paper-based version before the workshop commenced. Similar to other published surveys using the TDF (Beenstock et al., 2012; Dyson, Lawton, Jackson, & Cheater, 2010), participants were asked to respond to statements relating to all 14 domains of the TDF, using a 5-point Likert Scale ranging from 'strongly disagree' to 'strongly agree'. The survey statements were informed by the responses of speech pathologists who had been interviewed in our previous study (Shrubsole et al, 2018) and a review of the literature. Initially, three statements per domain were used, but these were reduced to two statements for eight domains - '*knowledge', 'skills', 'optimism', 'reinforcement', 'intentions', 'goals', 'emotion' and 'behavioural regulation'* – following feedback from piloting of the survey. The survey items were balanced so that the number of negative and positive items were equal, and the survey statements were randomly ordered.

Demographic data was collected and examined participants' age, gender, number of years working as a speech pathologist, number of years working with people with aphasia and current practice areas. In addition, participants were asked to estimate their adherence to the recommended practices in the form of a percentage. The survey contained 68 items related to the TDF (34 for each behaviour) and took approximately 10 minutes to complete.

The survey results were analysed using Stata (StataCorp, 2015). Positive statements (such as "*Recommendations are readily available for providing tailored aphasia-friendly information")* on the Likert scale were scored from 1 (strongly disagree) to 5 (strongly agree), with negative statements (e.g., "*I have insufficient time to engage in collaborative goal-setting with people with aphasia"*) scored in the reverse manner (i.e., 1 = strongly agree). Mean scores for each domain were calculated for each participant. Following completion of the follow-up surveys, the analysis was completed using the same procedure. Change scores for each domain were calculated for each participant who completed both the pre- and post-intervention survey, by subtracting the mean pre-intervention score from the mean post-intervention score for each domain. The change in mean domain scores for each cluster were analysed for both targeted and non-targeted behaviours. Linear regression examined the relationship between the change in domain scores and the behaviours of interest. We hypothesised that there would be a change in the domains targeted by the interventions.

3. **Intervention delivery fidelity checklist:** A self-reported checklist (see Appendix D-9) was used by the researchers delivering the workshops to document core information about each intervention session (such as date, duration and number of participants) and the extent to which the components of each intervention was delivered as planned (e.g., PowerPoint presentation, video of person with aphasia). These components were linked to the intervention functions as previously outlined in Table 7-2. This checklist was completed immediately after each workshop and included sections for comment and reflection. This data was analysed descriptively and used to determine the fidelity of delivering the implementation intervention, which is important in furthering our understanding of the designed interventions' feasibility and potential effectiveness.

4. **Post study focus groups:** Focus groups were conducted with participants in all clusters at the end of the study, to obtain specific feedback about the acceptability of the implementation intervention and their perceptions on the potential effectiveness (i.e. what changes they made to their practice and why). Detailed field notes were made by the facilitators of these focus groups, using the form presented in Appendix D-10. The field notes are used to present qualitative

findings about the study in the thesis. The more detailed analysis of the data from the transcripts will be published elsewhere.

7.3.5 *Sample Size Justification and Statistical Analysis:*

As the purpose of this study was to provide pilot data regarding the feasibility, acceptability and potential effectiveness (Craig et al., 2008; Eldridge et al., 2016) of a tailored implementation strategy, the sample size was not powered to detect significant clinical change. Between-group pre-post analysis on the primary outcome measure (change score) was used to determine if the intervention was successful using Fisher's exact test of independence. Analysis took clusters into account (i.e. performance of clinicians in same hospital). Alpha level was set at $p<0.05$. This level of significance was utilised due to the pilot nature of this research and to minimise the large possibility of Type II errors (Perneger,1998).

Table 7-3. Outcome Measures

Outcome (Outcome Category)	**Data Collection Method**	**Outcome Assessment period**	**Source**	**Level Data collected at**
Provision of recommended behaviours (information provision and goal setting)*	Medical record audit	Baseline, approx. 4 months post workshop	Clinician documentation	Patient
Provision of recommended behaviours (information provision and goal setting)	Checklist completed by clinicians	Implementation phase (12-24 weeks)	Clinician (self-report)	Patient
Provision of recommended behaviours	Survey	Baseline, 3-6 months post workshop	Clinician (self-report)	Clinician
Behavioural constructs (e.g., knowledge, skills)	Survey	Baseline, 3-6 months post workshop	Clinician (self-report)	Clinician
Intervention fidelity and participant response	Intervention Delivery checklist	Immediately post workshop	Researcher (self-report)	Clinician, Researcher
Feasibility, usefulness	Focus groups	1-2 months post study completion	Clinician (self-report)	Clinician

* *Primary outcome measure*

7.4 Results

An overview of the results from the trial is presented using a CONSORT flow diagram for cluster randomised trials, shown in Figure 7-3. Six speech pathologists (each acting as a representative for their hospital's speech pathology team) responded to the recruitment email sent via the Speech Pathology Email Chat (SPECs) group and requested further information from the lead investigator. One team was not eligible as it was located outside of Australia. Phone calls were made to the

contacting speech pathologists to describe the study in more detail and to determine eligibility. The lead investigator contacted the speech pathology managers of the remaining five departments to gain gatekeeper approval for the study (Gallo et al., 2012). One manager did not respond, so four hospitals in two states of Australia (New South Wales and Queensland) were recruited, two from each state. Details of the participating hospitals are provided in Table 7-4. All speech pathologists who worked in the acute stroke unit in each cluster agreed to participate.

Data regarding the study participants (including age, sex and clinical grade), whether they attended the implementation workshop, and whether they completed both the pre-and post-implementation surveys are presented in Table 7-5. The majority of participants were female (36/37 = 97.3%), entry-level clinicians (Level 1/2 in Queensland, or Health Professional (HP) Grade 3 in New South Wales, 15/37 = 40.5%), with a mean age of 30 years.

Table 7-4. Details of Participating Hospitals

Cluster	**State**	**Allocated intervention (Group)**	**Number of acute SLP FTE positions**	**Acute stroke unit beds**	**Patients with stroke admitted 2016** To hospital	To ASU
1	Queensland	Goal Setting (B)	2 (acute and rehab)	4	113	70
2	Queensland	Information Provision (A)	10 (acute)	6	435	227
3	New South Wales	Goal Setting (B)	10.6 (acute)	10	559	390
4	New South Wales	Information Provision (A)	6.21 (acute)	12	550	366

Key: SLP = Speech language pathologist, FTE = Full-time equivalent, ASU = Acute stroke unit

Table 7-5. Details of Speech Pathology Participants

Cluster	**Demographics**		**Grade/ Level (*n*)**	**Workshop Attendees**	**Workshop Absentees**
	Age (range)	**Sex (F)**		**Completed pre and post surveys?**	**Completed pre and post surveys?**
1 (Intervention B) *Workshop delivered on 15/09/2016*	(28-29)		HP5 (1) HP4 (1) HP3 (2)	*Subtotal n = 3, 100%*	*Subtotal n = 1, 100%* (*attended individual session 07/11/16 by researcher KS*)
	Mean = 28.25	*100%*	*Total participants for Cluster 1; n = 4* *Survey response rate (Pre AND Post) = 100%*		
2 (Intervention A) *Workshop delivered on 29/09/2016*	(23- 59)		n/r (1) HP5 (2) HP4/5 (1) HP4 (2) HP3 (6)	*Subtotal n = 10, 70%*	*Subtotal n = 2, 0%* (*provided by team leader when new staff started in positions)*
	Mean = 31.5	*92%*	*Total participants for Cluster 2; n = 12* *Survey response rate (Pre AND Post) = 58%*		
3 (Intervention B)	(28-40)		n/r (2)		*Subtotal n = 1, 100%*

Workshop delivered on 06/10/2016			5 (2) 4 (1) 3 (2) 1/2 (3)	*Subtotal n = 9, 77.78%*	(*video recording of workshop sent to participant)*
	Mean = 29.9	*100%*	*Total participants for Cluster 3; n = 10* *Survey response rate (Pre AND Post) = 80%*		
4 (Intervention A) *Workshop delivered on 20/10/16*	23-40		n/r (1) 5 (1) 3 (5) 1/2 (4)	*Subtotal n = 8, 100%*	*Subtotal n = 3, 66.67%* (*provided by team leader at team meeting – audio recording also available)*
	Mean = 29.1	*100%*	*Total participants for site 4; n = 11* *Survey response rate (Pre AND Post) = 91%*		
Overall	*Mean = 29.69*	*97.31%*	*15/37 base-grade (HP3 or Level 1/2), 11/37 senior (HP4 or Level 3), 8/37 advanced/team leader (HP5 or Level 4 and above)*		

n/r = no response

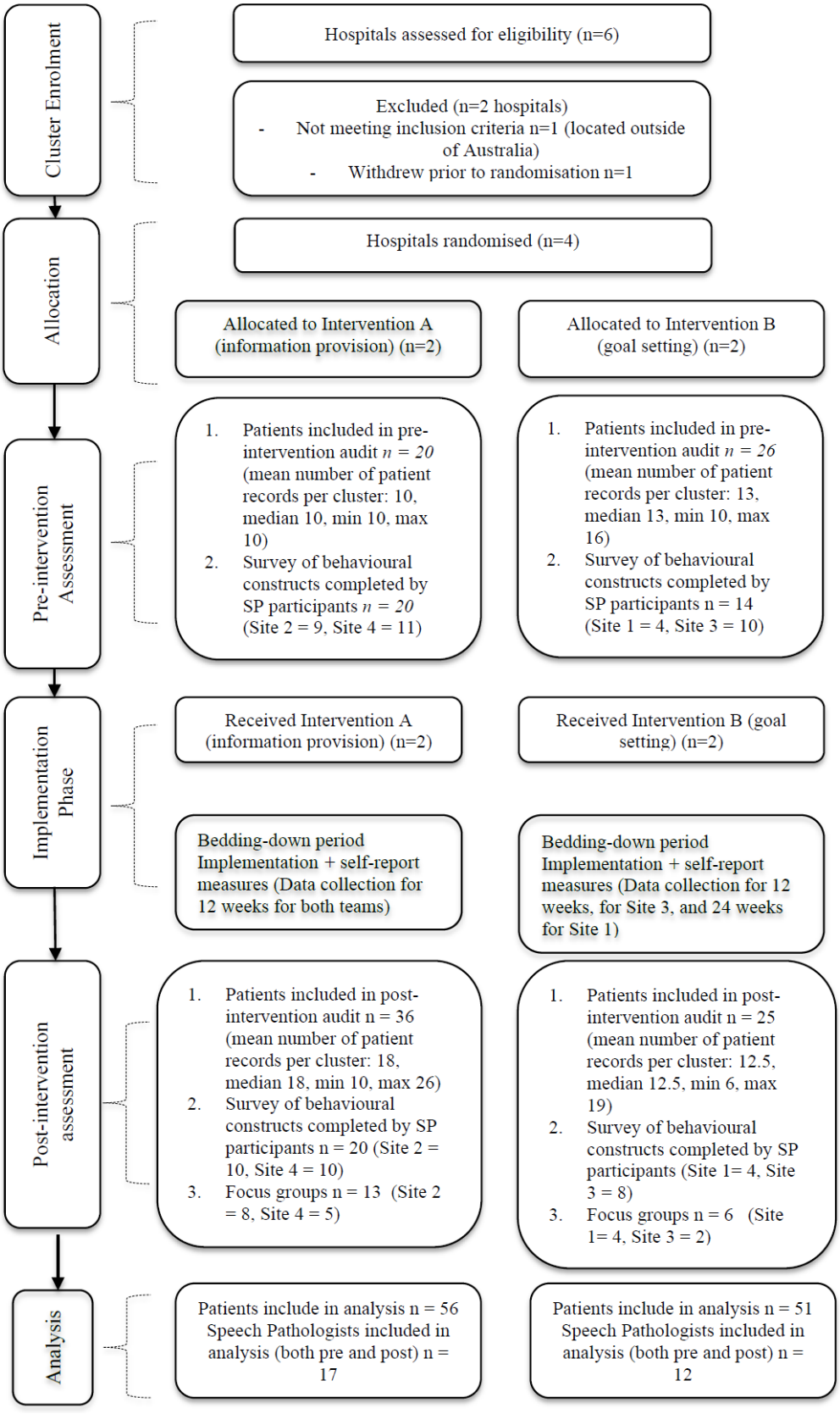

Figure 7-3. CONSORT Diagram of Study Procedure and Data

7.4.1 *Feasibility*

Feasibility of intervention attendance and data collection: The implementation workshops were conducted onsite at each hospital in pre-booked conference rooms. The attendance rate at the implementation workshops was very good (100% for Clusters 1, 2 and 4, 75.5% for Cluster 3), and all four speech pathology teams completed the study. 78% of participants (29/37) completed both the pre and post surveys, with the main reason for non-completion being that the staff member had moved teams or hospitals. All teams completed the Case Encounter Checklists and minimal follow-up was required to obtain this data.

Feasibility of delivering the intervention as planned (fidelity): All workshops were delivered by one person (author KS) as the lead facilitator, and one additional facilitator (either LW or EP), thus ensuring consistency of information delivery and intervention processes. The three workshop facilitators attended a practice session prior to delivering the interventions to maximise the consistency of the messaging within the workshop. Interventions were delivered as intended at all sites with the exception of Cluster 2 (assigned to Intervention A) where one of the researchers was unable to attend via videoconferencing due to technical difficulties, however the lead facilitator (KS) was present face-to-face. For all other clusters, two facilitators were present. In three clusters (1, 3 and 4), one or more participants were absent on the day of the intervention workshop (refer to more specific details on workshop attendees and absences in Table 7-5). Each team decided on their own strategy to overcome this barrier. Cluster 1 received a face-to-face follow up session for the single absent participant. Cluster 4 audio-recorded the workshop and Cluster 3 video-recorded the workshop to disseminate to the absent participants, however these recordings were not used as reported in the follow-up focus groups.

In all clusters, time constraints were an issue that impacted on the workshop delivery. The interactive discussion component (including barrier identification and problem-solving) took longer than anticipated for most clusters, and therefore the 'modelling' component of the workshop was compressed. Initially this was planned to include scripted role-plays with the facilitators, but was compressed to include general examples, so that the small group activities could occur. In addition, time to look at resources in all sites was compressed. Time to engage in role-play activities was also reduced in both goal setting clusters (1 and 3); the facilitators reflected that this may have been due to the more detailed educational and theoretical components of this workshop and the more complex nature of the behaviour.

7.4.2 *Acceptability and Participant Response*

Results from the Intervention Delivery Checklist indicated that participant response was generally very good, with approximately 75%-100% of the participants contributing to discussion for most clusters (1, 2, and 4). However, for Cluster 3, only 50% of the participants contributed to the discussion, and the facilitators reflected that the group atmosphere was more formal and less interactive than the other teams. For this cluster, it was difficult to engage participants in discussion for the first hour of the workshop, however once one of the senior clinicians started to contribute to the discussion, reflecting on her own positive experiences, the group atmosphere and resulting discussion improved.

During the delivery of the workshops, participants generally agreed with the results of the baseline audits, stating that they were an accurate reflection of their actual practice. Participants were then able to identify barriers to implementing the recommended behaviours and brainstorm strategies to overcome these barriers.

Participants in all clusters actively engaged in the brainstorming activities and facilitated discussion, indicating that is was an acceptable component of the workshop. Each cluster developed their own strategies to support implementation of the target behaviour, and generated their own goal for the follow-up medical record audit, presented in Table 7-6.

Following the workshops, sites were contacted to determine a start date for the implementation phase and to answer any questions about the study. During the implementation phase, site liaisons at each site were contacted approximately four weeks after implementation commenced and then two weeks prior to completing data collection to obtain the case encounter checklist data sheets.

A total of 20 participants were involved in the four post-implementation focus groups (mean = 5, min = 3, max = 8), which were approximately 85 minutes long (range 60 – 105 minutes). Table 7-6 summarises the field notes, completed by the facilitators, which are relevant to the acceptability and potential effectiveness for each cluster. These field notes indicated that participants found the intervention acceptable, but there were suggestions for improvement, including a shorter time commitment, an online component, a follow-up session, and more demonstration of how to perform the target behaviours. In addition, three clusters reported that data collection during the study was acceptable. However, one cluster (allocated to Intervention A) reported that the data collection was a burden, and the use of patient and clinician codes in the Case Encounter Checklists was confusing.

Table 7-6. Workshop Strategies and Summary of Focus Group Field Notes

Cluster	Workshop Strategies developed (Implementation Goal)	Summary of field notes from focus groups: Acceptability – Positive aspects of workshop	Acceptability – Suggestions for improvement	Potential Effectiveness – Aspects of workshop reported to change practice	Potential Effectiveness – Practice changes (outcomes)	Potential Effectiveness – External Contextual factors	Potential Effectiveness – Barriers & Enablers to change
				Intervention A*			
Cluster 2*	- Improving access to paper-based information resources to the wards by creating folders, - Discussing education needs with wider multidisciplinary team, - Improving documentation by having a written prompt or carrier phrase. **(90%)**	Resources provided, Group discussion, opportunity for reflection and problem-solving, having audit results, and role plays.	Shorter time commitment, possible online component, less confusing and burdensome data collection.	- Demonstration of resources & role play → improved knowledge and use of resources. - Change in beliefs about importance of providing written information – persuasion. - Social influences – making a goal and developing strategies as a team.	Improved documentation, improved handover, improved knowledge and use of resources, student projects, became more automatic/routine, changed location of and collated resources.	Staff changes may have reduced implementation and covering over Christmas period.	Barriers – staffing, access to technology and Wi-Fi, time Enablers – addition of a section to electronic medical record template, having student placements/ projects.
Cluster 4 *	- Sourcing resources for culturally and linguistically diverse populations, - Improving handover between speech pathologists by creating checklist of information provided, - Creating a folder of online resources that could be emailed to patient's families if issues accessing the family, - improving documentation by having a written prompt or carrier phrase **(80%)**	Resources provided, Group goal-setting and problem-solving, having audit results, having it face-to-face and tailored to them	More demonstration of how to tailor information, CALD resources, follow-up session	Change in beliefs and confidence in providing information and using term 'aphasia' – case studies Reflected on practice and realised they weren't meeting recs (audits) Resources provided improved knowledge and use Social influences – seen as a higher priority by the team	Positive reinforcement from patients More automatic/routine practice Team meeting agenda item Put all printed resources in one central location	Staff changes may have reduced implementation and covering over Christmas period, introduction of electronic medical records.	Barriers - staffing, access to technology and Wi-Fi, cost of resources, time, accessing family, lack of CALD resources. Enablers – addition of a section to electronic medical record template.

Cluster	Workshop Strategies developed (Implementation Goal)	Summary of field notes from focus groups: Acceptability – Positive aspects of workshop	Acceptability – Suggestions for improvement	Potential Effectiveness – Aspects of workshop reported to change practice	Potential Effectiveness – Practice changes (outcomes)	Potential Effectiveness – External Contextual factors	Potential Effectiveness – Barriers & Enablers to change
	Intervention B #						
Cluster 1 #	- Adding 'goals' heading to the departmental written handover document, - Agreeing on a carrier phrase to write in the notes, and - Introducing goals to the process and documentation of the acute stroke meeting or case conference after discussion with the multidisciplinary team **(70%)**	Group discussion, opportunity for reflection and problem-solving	Shorter time commitment.	Change in attitude and beliefs towards practice – case studies (Beliefs about capabilities, social role/ID) Improved documentation of practice – due to team strategies identified in workshop.	Improved documentation, improved handover, increased priority on identifying and educating re aphasia improved sense of engagement with clients.	Top-down change focussing on improving patient-centred care and documentation.	Barriers - Busy caseload, staff shortages, few PwA, short LOS, lack of access to family, patient-related factors. Enablers = template and phrases in handover.
Cluster 3 #	- Agreeing on a carrier phrase to write in the notes, - Introducing goals to the process and documentation of the acute stroke meeting or case conference after discussion with the multidisciplinary team, and - Exploring the idea of a 'passbook' that would be used to document goals and go with the patient on discharge **(70%)**	None reported – stated that they thought the workshop was not tailored to the acute setting and did not account for the barriers	More prescriptive resources, more demonstration of how to do goal-setting.	Did not believe the workshop changed practice, but may have improved documentation.	Improved documentation and increased team awareness of goal setting and knowledge of recommendations. Developed carrier phrase to use in documentation and team leader reminded them to complete the data collection.	None reported	Barriers – Busy and complex caseload, few appropriate clients, short LOS, lack of access to family, patient-related factors, lack of CALD resources, time. Enablers = none

7.4.3 *Potential effectiveness*

Potential effectiveness (participant's perspectives): Three of the clusters (1, 2 and 4) self-reported that the intervention had resulted in a practice change, presented in Table 7-6. Perceived important aspects of the workshop included: the provision of resources, group discussion with an opportunity for problem-solving and reflection or goal-setting, having their baseline audit results presented, participating in role play activities, and having the workshop face-to-face and tailored to them. Aspects of the interventions that reportedly resulted in change included the team discussions and goal-setting activities (Social Influences), using persuasive case studies to change beliefs about the importance of implementing the target behaviour and providing audit results (Beliefs about Consequences), use of role-plays to improve confidence in implementing the target behaviour (Beliefs about Capabilities), education about the target recommendations (Knowledge), and environmental restructuring through the provision of resources (Environmental Resources and Context). A range of outcomes were reported, such as improved documentation, improved handover, improved knowledge and use of resources, completion of student projects to assist in implementation, more automatic and routine practice, changed location of and collated resources. There were some external contextual factors that may have impacted successful implementation, including staff shortages, policy changes and structural changes to documentation. For example, one site had a self-appointed 'Site Champion' who led the project for their team. Another team stated that the introduction of electronic medical records made it easier to remember to include information provision in their documentation. Reported enablers to implementation included having student placements (Cluster 2) and having an agreed carrier phrase in the inpatient handover document to act as reminder (Cluster 1). Several barriers were reported, including difficulty accessing the patient's family, poor access to technology and Wi-Fi, the cost of resources, a lack of culturally and linguistically diverse (CALD) resources, and staffing. Clusters 1 and 3 also reported organisational and caseload barriers such as a short length of stay and busy and complex caseloads.

Of note, participants in Cluster 3 reported that the workshop did not result in any practice change, and that they did not believe it was tailored to their setting or their specific barriers. They initially suggested that more prescriptive resources may have been helpful, but then stated that due to the complexity of their stroke caseload, a prescriptive resource for goal setting would not have been possible.

Overall, the focus group facilitators reflected that the participants generally had difficulty reporting the specific aspects of the intervention that resulted in change, and also had some difficulty recalling some of the strategies identified in the workshop. In addition, the majority of

sites had not monitored their progress in the implementation, and had not reflected on ongoing barriers as a team following the initial workshop. The facilitators also reflected that the addition of a follow-up session might have addressed some of these issues. A key factor that may have had a positive implementation impact for Cluster 2 appeared to be that the team leader drove the project and acted as a site champion. The participants in Cluster 3 did not seem to believe that the recommended practice was a priority for their team, which could have impacted on the lack of change in their practice.

Potential Effectiveness of Intervention on Practice: Although not powered to detect differences between groups on the outcome measures, the following results relating to the medical record audits and behavioural constructs survey form a pattern of effects that is presented as logic models in Figures 7-4 and 7-5.

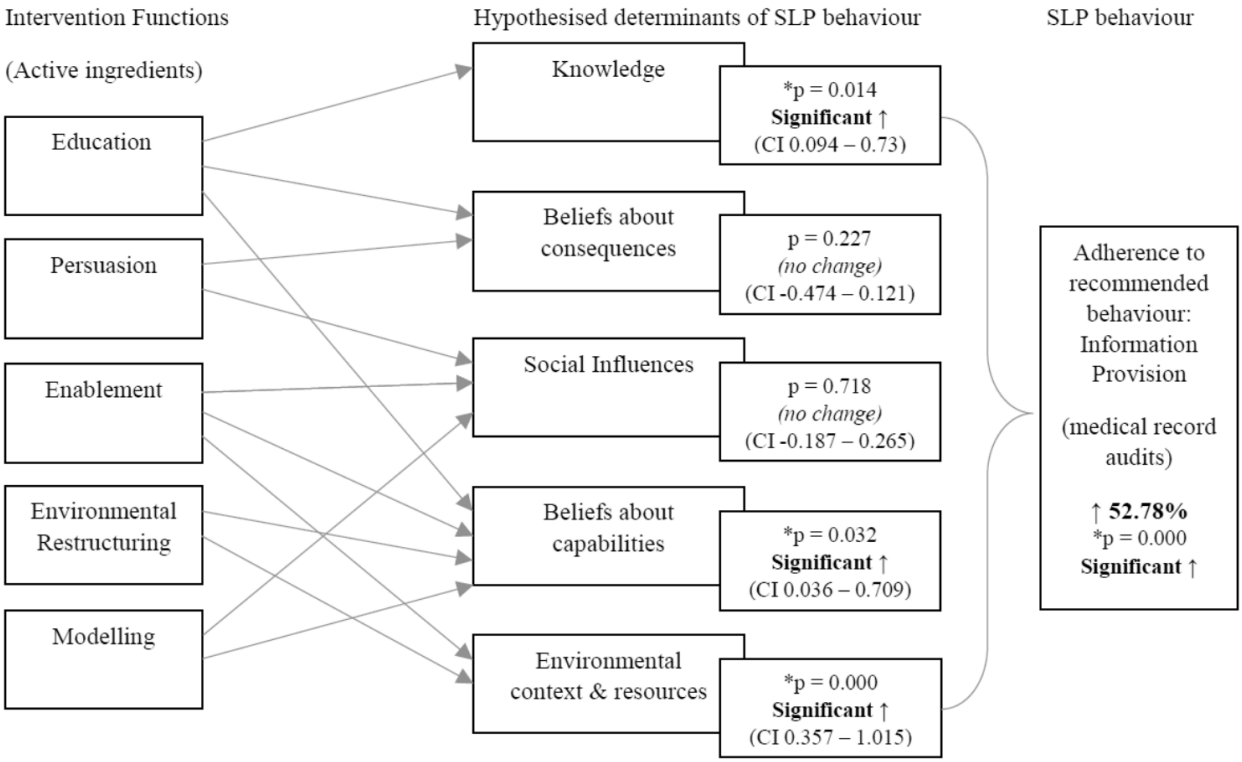

Figure 7-4. Logic Model: Information Provision

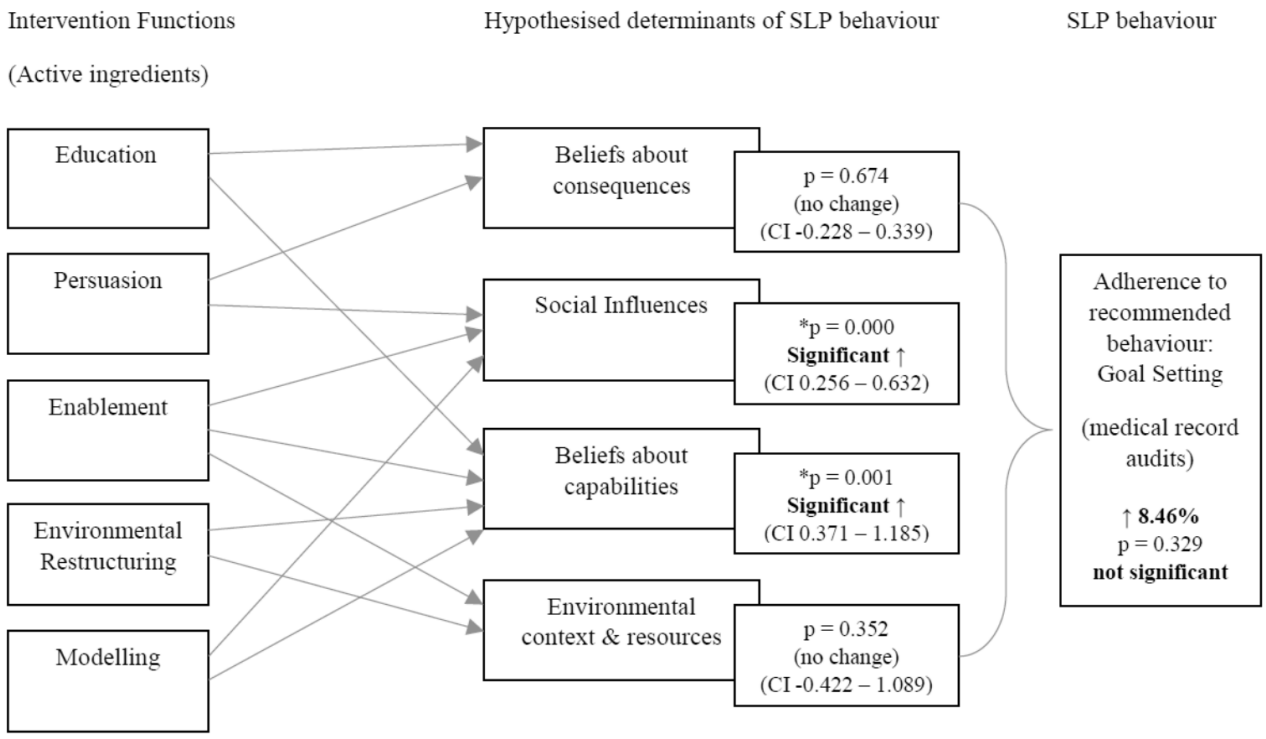

Figure 7-5. Logic Model: Goal Setting

Medical records of 46 patients were audited prior to the intervention and 61 patients post-intervention. No data was collected on numbers of patients that were excluded if they did not meet the study criteria. Therefore, medical chart data from 107 patients were included in the statistical analysis (post-intervention n = 61; information provision intervention n = 36, goal setting intervention n = 25). The inter-rater reliability was found to be 1 for all four outcome assessors, indicating complete agreement.

Data from the baseline audits are presented in Table 7-7. Fisher's exact test was used as the sample size was small and the data was found to violate the assumptions for Pearson's Chi-square. As a result, confidence intervals were not included, as the different computations used for Fisher's exact and confidence intervals could lead to discrepancies. For the provision of written aphasia-friendly information for all sites, baseline audit results ranged from 0 – 12.5% (mean = 6.52%). However, audit data also revealed that three of the sites provided *verbal* education to people with aphasia more frequently than written information (90%, 50% and 82% for Clusters 2, 3 and 4 respectively), while there was no difference between verbal and written information provision in the

remaining cluster's performance (Cluster 1 = 0%). For collaborative goal setting for all sites, baseline audit results ranged from 10 – 50% (mean = 20.625%).

Overall, when combining the data for both Interventions A and B, the target behaviours showed a significant improvement of 32.82% (p = 0.000), and the non-target behaviours showed a small but non-significant decrease of 4.28% (p = 0.539). When examining the results in the teams that received Intervention A, the target behaviour significantly improved (mean improvement 52.78%, p = 0.002), and the non-target behaviour significantly decreased (-30%, p = 0.001). For Intervention B, the target behaviour showed a small but non-significant increase (8.46%, p = 0.406), while the non-target behaviour significantly increased (24.31%, p = 0.29).

The concordance between the post-implementation medical record audits and the two self-report measures (case encounter checklists and survey data) was determined using two-sample test of proportions, and is presented in Table 7-8. This showed that there was no significant difference in the medical record audits and the Case Encounter Checklists for all clusters except Cluster 2, where the Case Encounter Checklists was significantly higher than the medical record audit for the goal setting behaviour (non-targeted behaviour). However, there were significant differences in the medical record audits and the self-report measure in the survey for at least one behaviour for three of the clusters (2, 3 and 4), with the self-report measures being higher than the file audit results.

Potential Impact of Intervention on addressing barriers (mechanisms of change): Some statistically significant changes in the targeted domains were found post-intervention for both intervention arms. This data is presented in Table 7-9. Specifically, for clusters allocated to Intervention A, there were significant improvements in the targeted domains of Knowledge (p = 0.014), Beliefs about Capabilities (p = 0.032), and Environmental Context and Resources (p = 0.000). There was no statistically significant change for either Beliefs about Consequences or Social Influences, which were both targeted by the intervention.

For Intervention B, there were statistically significant improvements in the targeted domains of Beliefs about Capabilities (p = 0.001) and Social Influences (p = 0.000). However, there was no statistically significant change for the domains Beliefs about Consequences or Environmental Context and Resources.

There were no statistically significant changes seen for either Intervention A nor B in the non-targeted domains, with one exception. For both interventions, the domain Skills significantly improved (p = 0.029; p = 0.000).

Table 7-7. Recommended Behaviour Provision by Cluster at Baseline and Post-Intervention (Medical Record Audits)

Intervention Provided	**Target Behaviour**				**Non-Target Behaviour**			
	Baseline	Post-intervention	Difference (Change)	Fisher's Exact (1-sided)	Baseline	Post-intervention	Difference (Change)	Fisher's Exact (1-sided)
Intervention A								
Cluster 2	0/10, 0%	12/26, 46%	↑ 46%	***p = 0.008** ↑	5/10, 50%	0/26, 0%	↓ 50%	***p = 0.001** ↓
Cluster 4	0/10, 0%	7/10, 70%	↑ 70%	***p = 0.002** ↑	1/10, 10%	0/10, 0	↓10%	p = 0.5 ↓
Both 2 + 4	0/20, 0%	19/36, 52.78%	↑ 52.78%	***p = 0.002** ↑	6/20, 30%	0/36, 0%	↓30%	***p = 0.001** ↓
Intervention B								
Cluster 1	1/10, 10%	1/6, 16.67%	↑ 6.67%	p = 0.625 ↑	0/10, 0%	3/6, 50%	↑ 50%	***p = 0.036** ↑
Cluster 3	2/16, 12.5%	4/19, 21.05%	↑ 8.55%	p = 0.418 ↑	2/16, 12.5%	5/19, 26.31%	↑ 13.81%	p = 0.280 ↑
Both 1+ 3	3/26, 11.54%	5/25, 20%	↑8.46%	p = 0.329 ↑	2/26, 7.69%	8/25, 32%	↑24.31%	***p = 0.032** ↑
Both Interventions	3/46, 6.52%	24/61, 39.34%	↑32.82%	***p = 0.000** ↑	8/46, 17.39%	8/61, 13.11%	↓ -4.28%	p = 0.364 ↓

** Significant difference*

Table 7-8. Differences between Self-reported Behaviour Provision by Cluster Post-Intervention and Medical Record Audit (Checklists & Survey)

Intervention Provided	**Target Behaviour**				**Non-Target Behaviour**			
	Medical Record Audit	Self-Reported Adherence		Two-sample test of proportions	Medical Record Audit	Self-Reported Adherence		Two-sample test of proportions
Intervention A								
2	12/26, 46%	Checklist	14/33, 42%	p = 0.782	0/26 0%	Checklist	12/33, 36%	**p = 0.001*
		Survey	n=10, 73.75	p = 0.135		Survey	n=10, 70.625	**p = 0.000*
4	7/10, 70%	Checklist	7/10, 70%	p = 1	0/10, 0%	Checklist	1/10, 10%	p = 0.305
		Survey	n=8, 62%	p = 0.721		Survey	n=8, 65.6%	**p = 0.002*
Intervention B								
1	1/6, 16.67%	Checklist	1/6, 16.67%	p = 1	3/6, 50%	Checklist	2/6, 33%	p = 0.550
		Survey	75%	p = 0.429		Survey	n=4, 71.25%	p = 0.504
3	4/19, 21.05%	Checklist	11/20, 55%	p = 0.069	5/19, 26.31%	Checklist	5/20, 25%	p = 0.925
		Survey	n=10, 79.29	**p = 0.002*		Survey	n=10, 71.25%	**p = 0.020*

** Significant difference*

Table 7-9. Mean change in Domain scores per Intervention

	Intervention A Target Behaviour				**Intervention B Target Behaviour**			
	Domain	Change score (cluster)	Mean change	Linear regression (95%CI)	Domain	Change score (cluster)	Mean change	Linear regression (95%CI)
Targeted domains	**Knowledge**	0.286 (2) 0.5 (4)	**0.41**	**p = 0.014* **Significant ↑** (CI 0.094 – 0.73)				
	Beliefs about Capabilities	0.286 (2) 0.267 (4)	**0.37**	**p = 0.032* **Significant ↑** (CI 0.036 – 0.709)	**Beliefs about Capabilities**	0.83 (1) 0.75 (3)	**0.78**	**p = 0.001* **Significant ↑** (CI 0.371 – 1.185)
	Beliefs about Consequences	-0.43 (2) 0 (4)	-0.18	p = 0.227 (no change) (CI -0.474 – 0.121)	**Beliefs about Consequences**	0.25 (1) -0.04 (3)	0.06	p = 0.674 (no change) (CI -0.228 – 0.339)
	Environment Resources	0.71 (2) 0.7 (4)	**0.69**	**p = 0.000* **Significant ↑** (CI 0.357 – 1.015)	**Environment Resources**	-0.5 (1) 0.75 (3)	0.33	p = 0.352 (no change) (CI -0.422 – 1.089)
	Social Influences	-0.14 (2) 0.03 (4)	0.04	p = 0.718 (no change) (CI -0.187 – 0.265)	**Social Influences**	0.42 (1) 0.52 (3)	**0.49**	**p = 0.000* **Significant ↑** (CI 0.256 – 0.632)
Non-targeted domains	Skills	0.57 (2) 0.2 (4)	**0.32**	**p = 0.029* **Significant ↑** (CI 0.41 – 0.665)	Skills	0.75 (1) 1.13 (3)	**1**	**p = 0.000* **Significant ↑** (CI 0.551 – 1.449)
	Social Role ID	0.024 (2) -0.33 (4)	-0.02	p = 0.707 (no change) (CI -0.385 – 0.267)	Social Role ID	0 (1) -0.08 (3)	-0.06	*p = 0.800 (no change) (CI 0.41 – 0.665)
	Optimism	-0.143 (2) 0 (4)	-0.06	p = 0.565 (no change) (CI -0.406 – 0.23)	Optimism	-0.13 (1) 0.19 (3)	0.08	p = 0.615 (no change) (CI -0.271– 0.437)
	Reinforcement	0.21 (2) 0.2 (4)	0.21	p = 0.203 (no change) (CI -0.123 – 0.534)	Reinforcement	0.38 (1) 0.5 (3)	0.45	p = 0.160 (no change) (CI -0.212 – 1.128)
	Intentions	0 (2)	0.09	p = 0.455 (no change)	Intentions	0.0 (1)	0.29	p = 0.131 (no change)

		0.05 (4)		(CI -0.156 – 0.333)		0.44 (3)		(CI -0.102 – 0.686)
	Goals	0.5 (2) 0.1 (4)	0.26	p = 0.088 (no change) (CI -0.039 – 0.51)	Goals	-0.13 (1) 0.0 (3)	-0.04	p = 0.723 (no change) (CI -0.294 – 0.21)
	Memory, Decision making	0.41 (2) 0.267 (4)	0.363	p = 0.135 (no change) (CI -0.116 – 0.783)	Memory, Decision making	0.0 (1) 0.38 (3)	0.25	p = 0.250 (no change) (CI -0.203 – 0.703)
	Emotion	0.29 (2) 0.0 (4)	0.18	p = 0.188 (no change) (CI -0.095 – 0.448)	Emotion	-0.5 (1) 0.25 (3)	0	p = 1 (no change) (CI -0.406 – 0.406)
	Behavioural Regulation	0.57 (2) 0.2 (4)	0.35	p = 0.188 (no change) (CI -0.191 – 0.896)	Behavioural Regulation	0.13 (1) 0.38 (3)	0.29	p = 0.223 (no change) (CI -0.205 – 0.789)
					Knowledge	-0.13 (1) 0.56 (3)	0.33	p = 0.166 (no change) (CI -1.613 – 0.828)

7.5 Discussion

The main aim of this study was to design and test the feasibility, acceptability and potential effectiveness of a tailored implementation strategy to improve speech pathologists' post-stroke aphasia management practices in the acute hospital setting. Using a pilot cluster RCT, four teams received an intervention targeted at one of two target behaviours: *Information, Education and Aphasia-friendly information* (Intervention A)*;* or *Collaborative Goal Setting* (Intervention B). This study is the first to our knowledge that has used a tailored, theoretical approach to improve speech pathologists' aphasia management practices.

Our study has shown a tailored implementation intervention targeting acute speech pathologist's aphasia management practices is feasible to deliver and acceptable for most participants. In addition, such an intervention is potentially effective in changing speech pathologists' management of people with aphasia in the acute hospital setting. Following delivery of the information provision intervention (Intervention A), the proportion of patients with aphasia who received written aphasia-friendly information significantly increased (52.75%). In the non-targeted (control) behaviour for these clusters, there was either no change or a decrease in their performances, indicating that the intervention did not change the non-targeted behaviour (i.e., that the intervention improved the behaviour that was targeted, but not the control behaviour).

However, for teams that received the goal setting intervention (Intervention B), there was no significant change in performance of the targeted behaviour, with small improvements of 6.67% for Cluster 1 and 8.55% for Cluster 3. Several factors may have led to these differing results between the interventions.

Firstly, participating clinicians were not involved in the selection of their target behaviour. Therefore it is possible that goal setting was not a priority for their team, and that support for performing the recommended practice from the perspective of the clinicians was lacking. This aspect of the study design may have reduced participant 'buy-in', which is an important factor in implementing change (Flodgren et al., 2011; Grol & Wensing, 2004; National Institute of Clinical Studies, 2006).

Moreover, our previous prioritisation research has identified that the two target behaviours we aimed to change in this study, had different ratings on a number of implementation criteria, including the *evidence-practice gap*, *modifiability*, and *health impact* (Shrubsole et al, 2017). There was a larger evidence-practice gap for collaborative goal setting in the acute phase compared to information provision (73% gap vs. 51% gap). In addition, qualitative evidence of modifiability

(reflecting evidence of barriers and facilitators to implementation) was less supportive of implementation for goal setting than for implementation for information provision, suggesting that the goal setting behaviour may be more difficult to change. Lastly, the health impact, or effect (on patient outcomes), of providing information was greater than for goal setting. Hence, as the target behaviours may not have been identically 'weighted' for implementation, this may explain some of the discrepancy in findings.

In addition, the nature of target behaviours themselves may have been a factor. Provision of written aphasia-friendly information may be more of a (speech pathology) discipline-specific behaviour than goal setting, which may require more of a team approach. In our previous barriers study (Shrubsole et al, 2018), speech pathologists working in rehabilitation reported that they engaged in collaborative goal-setting with people with aphasia most of the time or always, with facilitators including structured processes and routine (such as weekly case conferences) related to this practice, and the expectations of the multidisciplinary team. In contrast, acute speech pathologists reported a lack of these expectations of the multidisciplinary team, with more variable processes. Perhaps then, there would need to be more of an organisational or cultural change to improve the goal setting behaviour in the acute setting, which was not addressed in our intervention, as we did not involve other members of the multidisciplinary team. If a future intervention targeting goal setting had more of a multidisciplinary focus, it may be able to address the barriers of the Environmental Context, such as organisational culture, more successfully.

Finally, the clusters' baseline performances differed between those that received the information provision intervention and the goal setting intervention. Both clusters receiving the information provision intervention performed well (50% and 90%) for the provision of *verbal* information provision, therefore only a simple change was required for this behaviour. In contrast, clusters in the goal setting arm had low baseline levels of adherence, indicating that more complex change was required. As it has been suggested that more complex behaviours are more difficult to change (Grol & Wensing, 2004; National Institute of Clinical Studies, 2006), this may also have impacted on the success of the goal setting intervention.

Interestingly, for one cluster (Cluster 1), the non-targeted (control) behaviour of Aphasia-friendly Information Provision significantly improved. Again, it is possible that this was due to the nature of the behaviours; in order to engage in collaborative goal setting with a person with aphasia, it may first be necessary for clinicians to provide information and education *about* the patient's aphasia. In this way, while information provision was not the target of the intervention, clinicians could have changed their behaviour in providing information as a first step to changing the more

complex behaviour of goal setting. Qualitative analysis of the focus group may provide further explanation of this finding.

Although not powered to detect significant differences between groups, the pattern of effects shown in the logic models (Figures 7-4 and 7-5) indicate that the implementation interventions were potentially effective in addressing at least *some* of the targeted barriers. There were significant improvements seen in the targeted domains of Knowledge, Beliefs about Capabilities and Environmental Context and Resources for Intervention A, and Beliefs about Capabilities and Social Influences for Intervention B. These results may indicate that the interventions were successful in addressing these identified barriers, but may need modification to effectively address the domains that showed no improvement (e.g., Beliefs about Consequences and Social Influences in Intervention A). The fact that the non-targeted domains did not change in either group is further evidence that the interventions addressed the intended barriers, with one exception. Interestingly, the domain change scores significantly improved for the domain Skills in both groups. One explanation for this change is that the selected intervention functions inadvertently targeted a related aspect of the Behaviour Change Wheel. For example, the intervention function of modelling that aimed to improve Beliefs about Capabilities is likely to have also impacted clinicians' perceptions of their Skills.

It is somewhat unclear how changes in the surveyed domain scores related to clinicians' practices. For example, Beliefs about Capabilities and Social Influences positively changed for both teams in Intervention B (Collaborative Goal Setting), but this did *not* translate into a significant change in practice for this behaviour. However, for Intervention A (Aphasia-friendly Information Provision), the improvements in the targeted domains of Knowledge, Beliefs about Capabilities, and Environmental Context and Resources resulted in a positive, clinically significant practice change. Interestingly, neither intervention appeared to successfully change Beliefs about Consequences, and yet, the information provision behaviour still improved. In trying to understand the mechanisms of behaviour change, we hypothesise that the Environmental Context and Resource barriers (such as busy caseloads with short length of stay, and lack of access to patients' families) identified by both clusters who received Intervention B (in the focus group data) were not adequately addressed by our intervention, which may partly explain the limited behaviour change results seen. The additional factors of the complexity of the goal setting behaviour, the low baseline adherence, and the lack of participant buy-in, may also have contributed to these findings. The nature of behaviour change is complex, and the mechanisms by which behaviour change occurs need further research to improve our understanding (Baker et al., 2015). The behavioural constructs

survey used in this study was helpful in explaining some of the mechanisms of change, but a more extensive process evaluation (Craig et al., 2008) may also provide additional useful information.

The self-reported adherence measures in the survey were consistently higher than the medical record audit results. This is consistent with previous literature showing that clinicians tend to overestimate their performance (Adams, Soumerai, Lomas & Ross-Degnan, 1999). While it is possible that clinicians *were* performing the target behaviours but not documenting them in the medical record, this is unlikely as (a) the workshop participants agreed with the results of the file audits, and (b) the Case Encounter Checklist data was generally consistent with the audits. As funding structures for healthcare continue to evolve, it is increasingly expected that healthcare professionals document every aspect of the service that they provide. It is possible that future funding of stroke services will be linked to performance on key indicators of stroke care, and thus, accurate documentation is increasingly important. One way to account for these differences between outcome measures would be to observe clinicians actually performing the behaviours, as is routinely done in the area of hand hygiene (Linam et al., 2016). This could be the focus of future methodological work.

Qualitative work conducted alongside this study (Hickey, Worrall, Power, & Shrubsole, In preparation) indicated that internal (e.g., site champion) and external factors (e.g., electronic medical records) also influenced whether participants changed their practice for the target behaviours. This indicates the importance of understanding the context when conducing implementation research, as shown in other implementation studies (e.g., Lynch, Cadilhac, Luker, & Hillier, 2016). Recommendations for future work are that other key stakeholder groups (such as multidisciplinary team members and healthcare consumers) are involved in the implementation interventions, to develop a shared understanding of the importance of implementing these behaviours consistently. An integrated intervention, supported by multiple stakeholder groups, could lead to further improvements in these practices, as seen in Simmons-Mackie and colleagues' aphasia implementation study (2007).

Our findings add to the implementation literature in the field of post-stroke aphasia, which, until now, has predominantly shown change in clinician's behaviours through qualitative self-report measures (Horton et al., 2016; Jensen et al., 2014; Simmons-Mackie et al., 2007; Wielaert et al., 2016). Our study has demonstrated quantitative improvements in speech pathologists' provision of recommended behaviours, which were statistically significant for the provision of written aphasia-friendly information (targeted by Intervention A). The small improvements seen in the collaborative goal setting behaviour (Intervention B), while not statistically significant, are

somewhat consistent with implementation literature showing that most interventions have some effect, with an average of approximately 10% improvement (Grol & Grimshaw, 2003). This difference in effect between our two interventions may indicate that, while there are questions about why the goal setting intervention was not as effective in changing practice, it was an adequate attention control for the study design.

In addition, this study showed that behaviour change interventions prospectively targeted at addressing known barriers to implementation are potentially effective in improving speech pathologists' practice. None of the previously published aphasia implementation studies have used this method of implementing a prospectively tailored intervention (Horton et al., 2016; Jensen et al., 2014; Simmons-Mackie et al., 2007; Wielaert et al., 2016), therefore our study adds support for the use of tailoring.

Furthermore, this study has provided some understanding of the mechanisms of behaviour change that occurred during implementation, which has previously not been addressed in aphasia-related implementation research. Therefore, this is the first implementation study in aphasia that is able to attribute some of the effects on clinicians' practice to the tested interventions. This improved understanding of whether and how tailored implementation interventions can change speech pathologists' practices, may help future implementation research in the field of aphasia.

7.5.1 *Limitations*

Although the interventions were tailored to prospectively address identified barriers, they were largely designed without knowledge of the local barriers for each site. While attempts were made to identify the local barriers prior to the delivery of the implementation workshop (through the pre-intervention survey), most clinicians did not complete the survey until the day before or the day of the workshop. However, discussion of barriers throughout the workshop meant that some specific tailoring did occur (such as brainstorming strategies to overcome local barriers).

In addition, the design of the behavioural constructs survey had limitations. There was a potential ceiling effect in the rating scale used in the survey, and there was missing data when clinicians did not complete both pre- and post- implementation surveys to determine the change scores. In addition, it is unknown what impact the practice changes had on patient outcomes, as these outcome measures were not included in the design of the study. Furthermore, it is not known whether the changes will be sustained over time, and future research in this area should include outcome measures at several time points to account for this (Graham et al., 2006).

7.6 Implications & Conclusion

Our study showed that a tailored theoretically-based implementation intervention targeting acute speech pathologist's aphasia management practices is feasible, acceptable and potentially effective. Furthermore, we have demonstrated that clinical behaviour change is possible for acute speech pathologists by targeting known barriers. This has implications for speech pathology departments and health services alike, highlighting the importance of identifying barriers prior to embarking on implementation efforts. Future implementation research in the field of aphasia management needs to take into account clinicians' priorities for aphasia management practices that they wish to improve, and how to sustain these practice changes over time.

7.7 References

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Chapter 8: Conclusion

This thesis investigated Australian speech pathologists' implementation of clinical practice guideline recommendations in the management of post-stroke aphasia. Chapter 1 introduced the thesis topics and aims, and Chapter 2 provided an overview of implementation theories, models, interventions and methodologies. The review of the speech pathology implementation literature (Chapter 3) demonstrated that there was evidence of numerous evidence-practice gaps within aphasia management. However, there was limited information about which recommendations were priorities for implementation and how to prioritise implementation targets. Additionally, there was a lack of detailed, aphasia-focused knowledge on what barriers speech pathologists considered to influence their evidence uptake in specific aphasia management practices. The review also highlighted that there was a lack of existing research investigating the effectiveness of implementation strategies aimed at improving speech pathologists' aphasia management practices. Previous studies were limited to one area of aphasia practice (conversation partner training) and lacked theoretical foundations believed to be important in both designing implementation research and explaining the nature of the study findings. These studies lacked quantitative outcome measures to demonstrate practice change, and there were limitations in their reporting of the implementation interventions themselves.

The studies contained in this thesis constituted the first investigation of implementation priorities, factors influencing implementation of specific practice areas, and theory-informed behaviour-change interventions, in the field of post-stroke aphasia. The research in this thesis followed four serial phases, with one study per phase, represented in Figure 8-1. The outcomes of each phase informed the subsequent phase. This concluding chapter will provide an overall summary of the findings from each of the four studies, draw together the clinical implications from each of these studies while also outlining the main limitations and future directions of the current research program.

8.1 Summary of Research Findings

The first aim of this thesis was to identify aphasia recommendations from high quality clinical practice guidelines, in order to determine which guideline recommended practices speech pathologists need to implement. Hence, the study in Phase I (Chapter 4) consisted of a systematic review that identified and assessed the quality of clinical practice guidelines relevant to stroke and aphasia according to the AGREE II Rigour of Development Domain. 111 recommendations from

four high-quality clinical practice guidelines relevant to aphasia management were extracted and synthesised. The remaining 76 clinical guideline recommendations were evaluated according to the applicability of the underlying evidence to speech pathology practice, and whether the recommendation could be clearly linked to the underlying evidence. 34 evidence-based recommendations were identified from this study.

Figure 8-1. Overview of Thesis Research Phases

The study in Phase II (Chapter 5) was a scoping review that addressed the second thesis aim: to identify the implementation priorities in post-stroke aphasia. Seven priority-setting criteria were identified in the implementation literature, including strength of the evidence; current evidence-practice gap; clinician preference; client preference; modifiability; measurability; and health impact. These criteria were applied to the 34 aphasia recommendations identified in Phase I, which were categorised into 13 topic areas. Evidence was identified and extracted for each criterion per topic area using systematised searches. Following this, the level of evidence for each criterion was summarised and evaluated using a decision-making process developed iteratively during analysis (i.e. high, moderate or low). The research team then developed an approach to prioritise the aphasia

implementation topics, where topics with 'High' evidence for criterion 1 (strength of the evidence), 'High' or 'Moderate' evidence for criterion 2 (the current evidence-practice gap), and evidence available to support implementation in any of the other criteria (criteria 3-7) were ranked. This analysis resulted in four implementation priorities - Timing, Amount and Intensity of Therapy; Goal Setting; Information, Education and Aphasia-friendly information; and Constraint-Induced Language Therapy.

In Phase III's study (Chapter 6), semi-structured interviews were conducted with 20 hospital-based speech pathologists across acute and inpatient rehabilitation services to identify the barriers and facilitators to meeting the prioritised aphasia management practices. Data was coded to the Theoretical Domains Framework using content analysis, and domains were considered important according to saliency analysis. Findings indicated that three theoretical domains - 'Environmental Context and Resources', 'Beliefs about Consequences', and 'Social Influences' - were key influencing factors for all topic areas. Other important domains included 'Knowledge', 'Beliefs about Capabilities', 'Goals' and 'Social/Professional Role and Identity', which each influenced at least two areas of practice. An additional finding was that clinicians working in the acute setting reported performing the majority of behaviours inconsistently or rarely, and reported more barriers than clinicians working in the inpatient rehabilitation setting. This study identified the theoretical domains that should be targeted by an implementation intervention aiming to improve speech pathologists' aphasia management practices (in the practice areas we investigated), thus providing a basis for the development of a tailored behaviour-change intervention.

The final aim of this thesis, addressed in Phase IV (Study 4, Chapter 7), was to design, pilot and evaluate the acceptability, feasibility, and potential effectiveness of a theoretically-informed implementation intervention aimed at improving speech pathologists' aphasia management practices. Study 4 was a pilot cluster randomised control trial, and included the design and delivery of an implementation intervention targeted at two priority areas of aphasia management (Information Provision or Collaborative Goal Setting) with four acute hospital speech pathology teams. The design of this study was informed by the findings emphasised by the literature review presented in Chapter 2. These features were: a) the use of a theory-informed approach in the design of the implementation interventions (i.e., the Theoretical Domains Framework and Behaviour Change Wheel), b) clear reporting of the design and delivery of the implementation interventions (i.e. adherence to the Template for Intervention Description and Replication (TIDieR) checklist (Hoffmann et al., 2014) and the Standards for Reporting Implementation Studies (StaRI) statement (Pinnock et al., 2017)), and c) tailoring of implementation interventions to address known barriers

(which were identified in Phase III). A secondary aim of this study was to determine whether the implementation interventions were successful in addressing the hypothesised predictors of behaviour. A key finding of this study was that the implementation interventions were feasible and acceptable to participating teams, with all sites completing the study with minimal dropout. In addition, the implementation intervention received by Intervention A (Information Provision) arm of the study was potentially effective in improving practice, with significant differences detected between baseline and follow-up practice audits for both teams that received this intervention. The implementation intervention for Intervention B (Collaborative Goal Setting), however, was potentially not effective in changing practice, as, although there were small improvements detected between baseline and follow-up audits, these differences were not statistically significant. The results of the behavioural constructs survey, used to detect change in the domains targeted by the intervention, were mixed, however, and therefore the proposed mechanisms of change were unclear based on the survey. The results of this pilot study were positive overall, and provide a basis to conduct a larger trial investigating the effect of tailored implementation interventions on aphasia management practices.

8.2 Clinical Implications

The program of research included in this thesis has highlighted three overarching clinical implications. These are: (a) Implementation interventions should be targeted at areas of practice that are of priority to clinicians and teams, (b) Local barriers and facilitators to change should be identified prior to commencing an implementation intervention, and (c) Teams need to be ready to change their practice and need assistance to do so. Each of these is discussed below.

8.2.1 *Implementation interventions should be targeted at areas of practice that are of priority to clinicians and teams*

Many factors that may help to enable successful implementation of aphasia guideline recommendations have been described in this thesis. Findings from the literature review (Chapters 2 and 3) showed that factors relating to the guideline recommendations are important, including the quality of the evidence and compatibility with clinicians' beliefs and values (Grol & Grimshaw, 2003). The results of the systematic review (Chapter 4) showed that there are many evidence-based recommendations from high-quality Clinical Practice Guidelines that are relevant to aphasia management, which is an important starting point when considering implementation (Goossens, Bossuyt, & de Haan, 2008; Grol & Wensing, 2004). However, other factors potentially influencing implementation were identified in the scoping review (Chapter 5), including once again, the perspectives and preferences of the clinicians (speech pathologists) themselves (Flodgren et al.,

2011; Grol & Wensing, 2004; National Institute of Clinical Studies, 2006). The barriers study (Chapter 6) reinforced this finding, showing that clinicians' beliefs and values strongly influenced their practice, and acted either as a barrier or a facilitator depending on the practice being implemented.

Therefore, it is important to target implementation efforts at evidence-practice gaps that are of priority to the clinicians and teams undertaking the implementation. Although both the barriers study (Chapter 6) and the pilot study (Chapter 7) were based on the implementation priorities identified in Phase II (which included clinician preference as one of the seven criteria for implementation), the priorities of the clinicians included in these Phase III and IV studies were not known. This is at odds with the knowledge that local buy-in is important (Soumerai & Avorn, 1990; Stead, Gordon, Angus, & McDermott, 2006), and may have impacted on the implementation of the Goal Setting practice in the Intervention B group of the pilot study. In addition, a lack of clinician buy-in to the implementation interventions may also have been due to the nature of the research process itself, where blinding and random allocation were required. Negative opinions of this practice in the acute setting were highlighted in the barriers study, and general poor performance in this activity at a national level (as demonstrated by the National Stroke Audit data), may indicate that clinicians do not value this practice or believe it to be important.

Hence, clinicians and researchers interested in improving implementation of aphasia management practices may need to prioritise the evidence-practice gaps at their local level. Further research into speech pathologist's and consumer's implementation priorities is needed.

8.2.2 *Local barriers and facilitators to change should be identified prior to commencing an implementation intervention*

This thesis demonstrated that the factors (barriers and facilitators) influencing practice differed depending on the individual clinician, their working environment, the clinical setting, and the practice being implemented. Given these differences, it is important to identify local implementation barriers, so that interventions can be targeted at overcoming these (Baker et al., 2010). For example, the domain 'Knowledge' was not reported to be a key barrier for most of the areas of practice we investigated in Phase III. However, implementation interventions in allied health have traditionally used education-based interventions aimed at improving knowledge, which may not correctly address clinicians' barriers to evidence uptake. As such, this thesis provides support for multifaceted and tailored interventions that use other methods (not only education) to address specific barriers, such as enablement to address 'Beliefs about Capabilities', and persuasive consumer statements to address 'Social Influences'. Therefore, it is important to identify the local

barriers and facilitators prior to implementation, so that known barriers can be addressed and monitored, as they may continue to arise throughout the intervention.

8.2.3 *Speech pathology teams need to be aware of the evidence-practice gaps and ready to change their practice, and need assistance to do so*

The studies in this thesis showed that speech pathologists were often unaware of their own performance in meeting the guideline recommendations. This finding was evident in the barriers study of Phase III (Chapter 6), where some participants had difficulty reflecting on their practice and the factors they perceived to influence their aphasia management. In Phase IV's pilot study (Chapter 7), this lack of awareness was even more apparent. None of the participating teams monitored their practice throughout the implementation study, and the majority had not taken the opportunity to reflect on their progress and problem-solve barriers that had arisen. All of the teams reported that they believed their practice had improved, but were unsure of the size of the change. However, the results of the clinical file audits showed that only two of the four teams had a substantial improvement in their practice, emphasising this lack of awareness of their practice. This lack of self-regulation may also have been a product of clinicians being involved in a research study lead by an external investigator (rather than leading the project themselves), however it is an important component that clusters did not monitor their progress.

Once the teams in the pilot study were more aware of their own practice (by receiving feedback on their baseline audits) and had received the implementation intervention, they often did not use the strategies they had suggested in the workshop, and in fact sometimes 'forgot' their own strategies. This finding highlights the possible need for ongoing support in implementation, such as additional problem-solving sessions and reminders, and the use of local Site Champions or academic detailing.

Therefore, it is important that speech pathology teams monitor their practice more closely, so that they have an awareness of where their local evidence-practice gaps exist. Field notes suggested that the audit data were powerful motivators for clinicians, but they did not initiate a process of self-evaluation and maintenance within the period. Potentially, providing clinicians with a model of knowledge translation and emphasising the role of checking and reflecting upon their practice may be of benefit. Until clinicians are aware of their own evidence-practice gaps, they may not understand the need to focus on implementation. As such, this lack of awareness may influence their readiness to change their practice.

In addition, speech pathology teams need ongoing support to improve their practice, and may benefit from more of an organisational focus on implementation that aims to address local barriers. Our study showed that despite a full-time project lead and academic support from the university section, implementation efforts do not always succeed. Hence, without these resources, who is responsible for driving implementation efforts in speech pathology practice? This consideration relates to the organisational and systems level changes that are needed in stroke care.

8.3 Implementation Implications

In addition to the clinical implications described above, this program of research also has implications for the field of implementation science.

8.3.1 *Target behaviours can be difficult to define due to the complexity of the clinician's role, and the end-user should be engaged in this process*

When undertaking implementation activities, it is important to clearly define the behaviours that are being targeted by implementation interventions (Cane, O'Connor, & Michie, 2012; Michie, Atkins, & West, 2014). The complex nature of the behaviours that speech pathologists perform as part of their role, however, needs to be acknowledged. As described in the discussion section of Chapter 7, clinicians may first need to provide information and education about aphasia before engaging in collaborative goal setting with a patient. Furthermore, the type of information may vary from patient to patient, depending on their needs and also their level of communication disability. A recent study into the assessment processes of speech pathologists with people with acute aphasia (Hersh, Wood & Armstrong, 2017) showed that integrated and individualised sessions were conducted by therapists, and highlighted that value of this informal approach in contrast to more rigid and prescribed formal assessment approaches. Hence, it is difficult to define clinicians' behaviours, and near impossible to prescribe the complex tasks that clinicians should perform. With this in mind, it should be an integral part of implementation efforts that discussion about the target behaviours occurs with the clinicians who will implement them, to aim for maximum agreement and as clear a description as possible.

8.3.2 *Fidelity and tailoring are both important, and there needs to be a balance between the two*

An overarching theme of this research was the need to use theory to produce replicable research with outcomes that can be explained by the features of the intervention. Hence, there needs to be clearly described interventions and there is merit in using components and behaviour change techniques from published catalogues such as the Behaviour Change Wheel (Michie, Stralen, &

West, 2011) and the Behaviour Change Taxonomy (Michie et al., 2013), as we did in the Phase IV study. Another advantage of using this approach is that it allows fidelity to be measured, which is also important in determining whether, and how, the intervention was modified and what impact this may have had on the outcomes. However, the Phase IV study showed that *tailoring* of interventions was also important for reasons of acceptability to participants and potential effectiveness. Feedback from participants showed that one site with minimal success in implementation did not believe that the intervention was tailored specifically to them, which may have impacted the intervention's effectiveness. This is not surprising, given that it is now well-established that tailored interventions are more effective (Baker et al, 2010; Baker et al, 2015). Nevertheless, it remains a challenge for researchers to design a well-described intervention that can be adhered to with high fidelity, while also allowing flexibility to permit adaptation at the local context, and adequately describing the degree to which interventions are tailored. Further consideration of this issue in implementation science is needed.

8.3.3 *Characteristics of implementation facilitators are likely a factor influencing whether an intervention is successful*

The inherent bias of being a speech pathologist conducting research into speech pathology practice in the Phase III and IV studies is also acknowledged. However, it may also be a strength of this research - it was likely important to be a speech pathologist who understood the nature of the challenges faced by the profession and to achieve credibility with participants. It is yet to be shown whether implementation interventions in speech pathology *need* to be led by speech pathologists. Still, in order to have the best chance of success, it is logical to endeavour to aim for this characteristic where target behaviours are very specific to speech pathologists' scope of practice. Future research should investigate the influence of the characteristics of workshop facilitators on implementation projects such as this, to determine which are most important.

8.4 Strengths and Limitations

A strength of Phase I, the systematic review and evaluation of aphasia clinical practice guidelines, was the use of the AGREE II tool's Rigour of Development domain (AGREE Next Steps Consortium, 2009). This domain was selected as it is the most indicative of guideline quality (Hurdowar et al., 2007), and scores from this domain have been used previously for this purpose (Adelaide Health Technology Assessment, 2008; Rohde, Worrall, & Le Dorze, 2013). Limitations of this review were that it excluded guidelines not published in English, and that the authors used novel criteria to synthesise and make decisions about the relevance of specific recommendations to aphasia management. These factors may have restricted the number of high-quality clinical practice

guidelines included, and the resulting identification of recommendations relevant to aphasia management. Nevertheless the study provided a synthesised list of evidence- and consensus-based recommendations that can be used to guide speech pathologists' post-stroke aphasia management.

A major strength of the scoping review of aphasia implementation priorities (Phase II) was the development of a criteria-based priority-setting process. The selection of the criteria was informed by the literature, and included both healthcare professionals' and consumers' perceptions of the importance of the recommendations. The resulting prioritisation process can be used as a guide to researchers and other stakeholders both in stroke and aphasia rehabilitation and in other areas of healthcare. In addition, although the implementation priorities generated in this research are intended for an Australian audience, the evidence informing prioritisation was sourced internationally, therefore could be applied to local evidence-practice gap data elsewhere (including internationally). A limitation of this study was that the scope of the current project did not allow for the critique of the methodological quality of each identified study. Furthermore, one member of the research team conducted many aspects of the decision-making process, potentially meaning that not all relevant evidence was found and summarised. A further limitation of this study was that clinicians' and consumer's priorities were identified through existing published evidence, and there were many gaps contained in these datasets. As such, it is not known which topics these stakeholder groups would prioritise from our topic list; this may form an area for future research.

A strength of the study conducted in Phase III, which used semi-structured interviews with hospital-based aphasia clinicians to identify factors influencing their aphasia management practices, was the sampling method. The inclusion of active aphasia treatment clinicians (speech pathologists) with a range of years of clinical experience, clinical roles, clinical settings and aphasia caseloads ensured that current perspectives on barriers and facilitators to meeting specific guideline recommendations were obtained. Inclusion of speech pathologists who potentially varied in their overall adherence to aphasia recommendations was also an important consideration to gain a maximum variation sample. This allowed us to obtain information on the practices of clinicians who had difficulty meeting the recommendations, and explore the factors influencing practice for these clinicians. It is acknowledged that the study only recruited participants from two Australian states, preventing participation from a broader range of locations. Therefore it is unknown whether the results were influenced by the participants' location of practice. This has since been investigated in a separate project, whereby a survey investigating these same guideline recommended behaviours was distributed to aphasia treatment clinicians Australia-wide. The findings from this survey are reported elsewhere (Young, Shrubsole, Worrall, & Power, 2018).

A strength of the pilot implementation study (Phase IV) was the adherence to internationally recognised methodological and reporting standards (i.e., TIDieR (Hoffmann et al., 2014) and StaRI (Pinnock et al., 2017)). Adherence to these standards was important to ensure quality and transparent reporting. A limitation of this study was that no patient outcome data was collected. It should be acknowledged, however, that the guideline recommended behaviours targeted in the implementation interventions were based on high levels of evidence (National Stroke Foundation, 2010), which, when adhered to, should result in important health outcomes. Previous work has shown that improved guideline adherence leads to improved patient outcomes in the stroke population (Hubbard et al., 2012). Nevertheless, future research should include patient outcomes, to improve understanding of the impact of implementation interventions on clients with aphasia. The design of Phase IV's study was both a strength and limitation. It included control measures for both intervention arms, allowing for maximum efficiency of data collection and the ability to compare teams' performances on targeted and non-targeted behaviours given the time constraints of the study (which did not allow for multiple baselines or crossover). However, the post-implementation follow-up data was only taken at one time-point, and therefore sustainability of the behaviour changes seen in the study is not known (Graham et al., 2006). In addition, the design of this study did not allow teams to select the target behaviours or be involved in the design of the intervention itself, which may have influenced their level of buy-in and therefore impacted their success. Previous research has indicated that consumer buy-in and positive attitudes may lead to increased success (Soumerai & Avorn, 1990; Stead et al., 2006). Therefore, future research should address these design limitations and are discussed below (see Future Directions).

The use of the Theoretical Domains Framework (TDF) in the Phase III and IV studies was both a strength and potential limitation of this program of research. The TDF provided a common framework for the development of the interview guide and subsequent data analysis (Phase III), and the development and evaluation of a tailored implementation intervention (Phase IV). As demonstrated in other research studies, the TDF was useful in both understanding the barriers to behaviour change and in designing successful behaviour change interventions (Duncan et al., 2012; Dyson, Lawton, Jackson, & Cheater, 2010). A strength of this approach was that these studies were informed by theory, which is believed to be important in explaining behaviour change, allowing for clear rationales of research methodology and potentially replicable results (Francis, O'Connor, & Curran, 2012; French et al., 2012). This also allowed the implementation interventions used in the pilot study to be tailored to known barriers (which were identified in Phase III), which is known to lead to significantly more effective behaviour change interventions (Baker et al., 2010).

However, despite some positive changes in behaviour demonstrated by the medical record audit results, it was somewhat unclear *how* the changes in the surveyed domain scores related to clinicians' practices. The implementation interventions appeared to successfully address the barriers of 'Knowledge', 'Beliefs about capabilities' and 'Environmental Context and Resources' for Intervention A, and 'Beliefs about capabilities' and 'Social Influences' for Intervention B, but these improvements did not translate to a change in practice for the Intervention B arm. The poorer outcomes for the Intervention B behaviour, goal setting, may be related to additional factors such as the complexity of the behaviour and a greater number of organisational barriers, however this could not be fully explained by the behavioural constructs survey used in our study. Therefore, it was difficult to confidently determine the mechanisms of behaviour change in the pilot study. It should be acknowledged that the behaviours being investigated were influenced by multiple theoretical domains, which may have made it difficult to delineate between these domains when evaluating the effectiveness of the implementation interventions in addressing the barriers. For example, it may have been difficult to improve 'Knowledge' and 'Beliefs about capabilities' without improving 'Skills', as the educational and modelling components of these interventions may have inadvertently affected the non-targeted domain. Furthermore, additional barriers may have arisen once the participating clinicians started to implement the recommendations. Thus, although the behavioural constructs survey was helpful in explaining some of the mechanisms of change, a more formal process evaluation (Craig et al., 2008) may provide a more complete explanation, and should be considered in future research. A final consideration is that the TDF survey used to measure the change in the barriers may not have been sensitive to change. Indeed, the study was not sufficiently powered to detect change on a 5-point scale if pre-intervention scores were close to ceiling. This issue presents a challenge for future research; while this and future implementation interventions may be considered successful, it is important to understand *how* behaviour change occurred so that it can be replicated (Baker et al., 2015).

One last potential limitation of using the TDF is that it mainly focusses on individuals and largely overlooks systems level factors, whereas the individual clinicians worked in teams and worked in organisations of differing characteristics. Although there are some domains that relate to systems level and organisational factors (e.g., 'Environmental Context and Resources' and 'Social Influences'), a more detailed exploration of the organisational characteristics may be required. This approach may have been important in the pilot study, as we implemented team-based interventions (although within a single discipline). Therefore, it may be valuable to use an additional model of change that focuses on teams and organisations (such as the Promoting Action on Research Implementation in Health Services model (Kitson et al., 2008)), in order to supplement the

individual focus of the TDF. In addition, the organisation's readiness for change should be considered, as this is a potential facilitator for effective implementation (Shea, Jacobs, Esserman, Bruce, & Weiner, 2014; Weiner, Amick, & Lee, 2008). As we did not measure the organisational readiness for change in the pilot study, it isn't known what impact it may have had on the results. Future research could incorporate an organisational readiness for change instrument to help determine the impact of the organisation on the implementation outcomes.

8.5 Future Directions

There is a need for further research to provide an evidence base for effective implementation interventions designed to close the evidence-practice gaps in post-stroke aphasia management. Therefore, future research involving a stepped wedged, cluster randomised trial of implementation interventions is planned. This proposed project will deliver a 'suite' of theory-informed multifaceted implementation interventions to speech pathology teams. Teams will select an implementation topic from a choice of prioritised areas that are both a) high in their strength of the evidence ratings, and b) have large documented evidence-practice gaps. Choice of implementation topic will allow teams to work towards an area of priority for their service, which will potentially overcome some of the limitations in the design of the pilot study. The delivery of this behaviour-change intervention will incorporate feedback from participants in the pilot study, in order to optimise acceptability to participating teams and to support the sustainability of their implementation topic over time.

Sustainability following implementation efforts is of key importance. Although there has been little research into the sustainability of interventions or innovations once they have been implemented (Wiltsey Stirman et al., 2012), it has been recognised that factors such as the organisational context and capacity may influence whether a practice is sustained. This adds further support to the use of an organisational model to measure how the organisational context may impact implementation efforts. As such, an Organisational Readiness for Change instrument will be used. In addition, the emphasis of this project will be on sustainability of the intervention to more aphasia teams in the long term. In order to facilitate sustainability, a site champion will be selected for each team, who will have ongoing support from the chief investigator, and assist in monitoring and supporting implementation at their hospital. A recent study showed that site champions can be used to effectively upscale implementation in stroke management (Middleton et al., 2016). A further aim of including site champions is to build further capacity for research translation within each team. In addition, rather than having a single face-to-face workshop, the proposed project will include one or more follow-up sessions to engage in further problem-solving and barrier identification to support

ongoing sustainability and generalisation. Outcome measurement will occur at multiple time-points post implementation, to track sustainability.

Future research into the impact of tailored implementation interventions on speech pathologists' practice should also include patient outcomes. As described in the literature review (Chapter 3), previous reviews of the implementation literature for allied health have highlighted the paucity of patient outcomes (Hakkennes & Dodd, 2008; Scott et al., 2012). More specifically, only two of the published implementation studies in speech pathology have included patient outcomes, and these did not show any change (Horton, Clark, Barton, Lane, & Pomeroy, 2016; Wielaert, Van de Sandt-Koenderman, Dammers, & Sage, 2016). Patient outcome data is important in demonstrating the impact of implementation research, both to funding bodies and clinicians alike. As such, the proposed project will include patient outcome data such as language assessment scores, quality-of-life and satisfaction measures.

The clear explanation of the mechanisms of behaviour change remains a challenge. In order to address this, future research should continue to adhere to reporting guidelines for implementation. The recently published Standards for Reporting Implementation Studies (StaRI) Checklist comprises 27 items, with a focus on describing the implementation strategy and the context in which the intervention took place, and how the strategy is expected to promote implementation (Pinnock et al., 2017). Further investigation and review of the outcome measures used to determine whether implementation has been successful will also be important. Prior to commencing the proposed project described above, the behavioural constructs survey will be reviewed to optimise validity and sensitivity. Indeed, it may eventuate that a generic TDF-based survey that has already been tested for validity would best suit this purpose (e.g., Huijg et al., 2014).

Finally, further research in this field may also involve targeted research to fill gaps highlighted in this doctoral research. These are particularly warranted in regards to prospective identification of clinician and consumer (people with aphasia and their family members) priorities for implementation efforts. The implementation prioritisation development methodology used in the current research has the potential to be applied to other areas of speech pathology practice, as well as more broadly within condition-specific areas of research such as stroke rehabilitation, where implementation priorities have not yet been identified.

8.6 Conclusion

Evidence-practice gaps exist across all areas of speech pathologists' post-stroke aphasia management practices. This thesis is the first comprehensive program of research to provide insight

into which areas of aphasia management should be prioritised for implementation, and which factors may influence speech pathologists' practice in these areas. Importantly, this research highlighted that the barriers to meeting guideline recommendations vary depending upon the clinical setting, and also vary between individual clinicians, reinforcing the importance of determining local barriers prior to commencing any implementation intervention. Moreover, this body of research showed that a tailored, theoretically informed implementation intervention was feasible, acceptable and potentially effective in changing speech pathologists' management of people with aphasia in the acute hospital setting. Despite the complexities associated with implementation science (such as the theories, models, domains, and outcome measures that can be used), behaviour-change is achievable for speech pathology teams working in the field of aphasia. It is hoped that this research will propel our understanding of how to improve and sustain speech pathologists' aphasia management practices, so that the ultimate aim - of closing the evidence-practice gaps in aphasia care - can be achieved.

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Appendices

Appendix A. Chapter 4, Search Strategy

Supplementary Search Information

Bibliographic Databases

Electronic database	Time Period
CINAHL (via EBsCoHost, 1982-present)	2012-2015
MEDLINE (via OVID, 1950-present)	2012-2015
Embase.com (1966-present)	2012-2015

Search terms for bibliographic databases

1. Guideline or guidelines
2. Clinical practice guideline or clinical practice guidelines
3. Recommendation or recommendations
4. 1 or 2 or 3
5. Aphasia
6. Dysphasia
7. 5 or 6
8. Stroke
9. Cardiovascular
10. 8 or 9
11. 7 or 10
12. 4 and 11

Guideline databases

Source	Location
TRIP	www.tripdatabase.com
The Internet Stroke Centre	www.strokecenter.org
Patient.co.uk	www.patient.co.uk
Guidelines and Audit Implementation Network	www.gain-ni.org

National Health and Medical Research Council	www.nhmrc.gov.au
Academy of Neurological Communication Disorders and Sciences	www.ancds.org
National Guideline Clearinghouse	www.guidelines.gov
National Institute for Clinical Evidence	www.nice.org.uk
Institute for Clinical Systems Improvement	www.icsi.org
Royal Australian College for General Practitioners	www.racgp.org.au
American College of Physician Guidelines	www.acponline.org/clinical_information/guidelines/
Guideline International Network Library	www.g-i-n.net/index.cfm?fuseaction=membersarea
National Clinical Guideline Centre	www.ncgc.ac.uk
Ontario Guideline Advisory Committee	www.gacguidelines.ca
National Health Services Evidence	www.evidence.nhs.uk
Royal College of Physicians Guideline and Audit Database	www.rcplondon.ac.uk/college/ceeu/search
Stroke Society of Australasia	www.strokesociety.com.au
National Health Service Centre for Reviews and Dissemination	www.york.ac.uk/inst/crd/
New Zealand Guidelines Group	www.nzgg.org.nz
Scottish Intercollegiate Guidelines Network	www.sign.ac.uk/guidelines
Veterans Health Administration	www.va.gov/health/

Search terms for guideline databases

Population	Stroke or aphasia
Limits	2012-2015

Additional sources of information

Source	Location

Internet	
Google search engine	www.google.com.au
Pearling	
The reference lists of included guidelines were reviewed to identify other relevant guidelines	

Search terms for the Internet

Element of clinical question	Suggested search terms
Population	Stroke or aphasia
Publication type	Guidelines

Appendix B. Chapter 5, Search Strategy

Supplementary Information – Systematic Searches

Example Search Strategy: CINAHL

1. Aphasia
2. Dysphasia
3. 1 or 2
4. Assessment
5. Tool
6. Screener
7. Screening
8. 4 or 5 or 6 or 7
9. Current practice
10. Practice
11. Gap
12. Service
13. 9 or 10 or 11 or 12
14. 3 and 8 and 13

Bibliographic Databases

Electronic database	Time Period
CINAHL (via EBsCoHost, 1982-present)	All
MEDLINE (via OVID, 1950-present)	All

Search terms for bibliographic databases

Category	**Subheading**	**Search Terms**
Population	N/A	Aphasia or Dysphasia
Topic Area	1. Assessment	Assessment or Tool or Screener or Screening
	2. Goal Setting	Goal setting or goal or goals
	3. Timing, amount, intensity	Amount of therapy or timing of therapy or early therapy or early rehabilitation or intensity of therapy
	4. CILT	Constraint induced language therapy or constraint induced aphasia therapy or CILT or CIAT

	5. Cog neruopsych therapy	Cognitive neuropsychological therapy OR neuropsychological OR cognitive linguistic OR semantic therapy OR phonemic therapy
	6. Group Therapy	Group therapy or group or groups
	7. Computer Therapy	Computer therapy or computer or computer treatment
	8. Conversation Partner Training	Conversation partner training or supported conversation or communication strategies
	9. AAC	Augmentative and alternative communication or AAC or strategy or compensatory
	10. Info/education and aphasia-friendly info	Information OR education OR aphasia-friendly
	11. Counselling	Counselling or counseling or counsel or psychological treatment
	12. Patient and caregiver support	Support or supporting or significant others or family or caregivers or carers
	13. Return to work	Return to work OR work OR employment OR vocation OR vocational rehabilitation
Criteria	2. Current practice/gap	Current practice or practice or gap or service
	3. Perceived importance – clinicians	Attitudes or experiences or perceptions or perspectives or satisfaction AND Speech-language pathologist or speech-language pathologists
	4. Perceived importance – Client	Attitudes or experiences or perceptions or perspectives or satisfaction AND Patient or patients or carer or carers
	7. Health Impact	Health impact or cost effectiveness or cost benefit

Stroke, Speech Pathology and Aphasia Websites

Source	Location
Speech Pathology Australia	http://www.speechpathologyaustralia.org.au
Australian Aphasia Association	http://www.aphasia.org.au
Royal College of Speech and Language Therapists	http://www.rcslt.org
Connect – the Communication Disability Network	http://www.ukconnect.org
American Speech-Language-Hearing Association	http://www.asha.org
ASHA's Evidence Maps – National Center for Evidence-Based Practice in Communication Disorders	http://ncepmaps.org
The Internet Stroke Center	www.strokecenter.org
speechBITE	http://speechbite.com
National Health and Medical Research Council	www.nhmrc.gov.au
Academy of Neurological Communication Disorders and Sciences	www.ancds.org
National Stroke Foundation	http://strokefoundation.com.au

Appendix C-1. Chapter 6, Ethics Approval

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

School of Health and Rehabilitation Sciences
Head of School
Professor Louise Hickson
BSpThy(Hons), MAud, PhD

CRICOS PROVIDER NUMBER 00025B

Ref: #SHRS–SpPath33636733

10 February 2014

Dear Kirstine Shrubsole

Re: Investigating the factors affecting speech pathologists' evidence uptake in aphasia rehabilitation: Examining the usefulness, feasibility and validity of conducting surveys vs interviews

I am pleased to advise that your project has been approved to proceed.

Yours sincerely

Associate Professor David Copland
Chair - School of Health and Rehabilitation Sciences
Research and Postgraduate Studies Committee
The University of Queensland

Appendix C-2. Chapter 6, COREQ Checklist

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	KS
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	Speech path
Occupation	3	What was their occupation at the time of the study?	Speech path/r
Gender	4	Was the researcher male or female?	N/A
Experience and training	5	What experience or training did the researcher have?	13 years exp
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	for some 161
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	some colleagu
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	161
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	content analys
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	maximum vari
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	email
Sample size	12	How many participants were in the study?	20
Non-participation	13	How many people refused to participate or dropped out? Reasons?	0
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	workplace, sky
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	no
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	table 6.2
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	piloted, appen
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	N/A
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	audio
Field notes	20	Were field notes made during and/or after the inter view or focus group?	yes after
Duration	21	What was the duration of the inter views or focus group?	68 minutes
Data saturation	22	Was data saturation discussed?	yes
Transcripts returned	23	Were transcripts returned to participants for comment and/or	no

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	2 for 20%
Description of the coding tree	25	Did authors provide a description of the coding tree?	yes, TDF
Derivation of themes	26	Were themes identified in advance or derived from the data?	both
Software	27	What software, if applicable, was used to manage the data?	Nvivo
Participant checking	28	Did participants provide feedback on the findings?	no
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	yes, additional
Data and findings consistent	30	Was there consistency between the data presented and the findings?	yes
Clarity of major themes	31	Were major themes clearly presented in the findings?	yes
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	yes

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.

Appendix C-3. Chapter 6, Interview Topic Guide

Interview Topic Guide *(Example for recommended practices 1 and 2)*

Briefing/Introduction

- Thank participant for taking part in research
- Introduce researcher
- Explain the purpose of the research:
  - I would like to talk to you about your experiences of working with people with aphasia, and the factors that influence your management. I am particularly interested in your perspectives on the barriers and facilitators to using the recommendations in the Australian stroke guidelines.
  - You do not have to answer every question and can cease the interview at any time if you wish.
- Explain interview process:
  - Interview will probably go for 1 – 2 hours (establish if want a break or separate into 2 session) depending on how much discussion arises
  - If at any point you would like to take a break, just let me know
  - Interview will be recorded
  - Researcher will take some notes during the interview to keep track of the main points
  - Explain importance of wanting to understand the experiences and perspectives of practicing SPs
- Do you have any questions for me at this stage?

Demographic information

- Age
- Sex
- Years of clinical practice as a speech pathologist
- Current role/position – which hospital? Acute/rehab/rural/teaching hospital etc. Grade/Level
- Estimated percentage of time spent providing aphasia rehabilitation

Recommended Practice 1: Health professionals should collaboratively set goals for patient care. Goals should be prescribed, specific and challenging. They should be recorded, reviewed and updated regularly. The stroke team should meet regularly with the patient and their family/carer to involve them in management, goal setting and planning for discharge.

1. Thinking about goal-setting, what do you normally do?
- What type of goals do you set? (Prompt for key components of recommendations: prescribed/specific/challenging, collaborative, meeting with patient and carer)?
- When? (Try to get a sense of how routinely they do it – weekly, beginning of therapy, regularly, reviewed/updated regularly?)
- How? In what format(s)? (collaboratively, meeting with patient/carer/team)

2. What helps or hinders you from doing this as per the guideline recommendation? (*Refer to guideline – go through all the elements)*
- Describe the factors that influence whether or not you engage in collaborative goal-setting with patient/carer? (Challenges/enablers)?

PROBES: ***I'd like to ask a few more questions about the factors that influence your practice***

TDF Domains	Prompt questions
Knowledge	How familiar are you with collaborative goal-setting process? How familiar with resources available? How familiar with guideline recommendations
Skills	How skilled are you? How equipped do you feel... What training have you undertaken, if any, in relation to engaging in goal-setting?
Social professional role and identity	To what extent do you think collaborative goal-setting is part of your role? To what extent do others in your workplace recognise this as part of your role?

1

Beliefs about capabilities	How confident are you in collaborative goal-setting? Is it easy or difficult to do? Explore Are there any challenges in goal-setting?
Optimism	How optimistic are you that the patient's outcomes will be better if you engage in collaborative goal-setting? How confident are you that (.... the desired goals will be achieved)?
Beliefs about consequences	What do you think the benefits are of engaging in collaborative goal-setting? (prompt for who?) What are the disadvantages of engaging in collaborative goal-setting? (prompt for who?) Do you think engaging in collaborative goal-setting is Important? Will lead to good/bad outcomes?
Reinforcement	Are there any incentives for collaborative goal-setting? Are there penalties for not engaging in collaborative goal-setting?
Intentions	How important do you feel it is to engage in collaborative goal-setting routinely? Is it a high priority?
Goals	Tell me what motivates you to engage in collaborative goal-setting? Why do you engage in collaborative goal-setting? (or don't you) – what's the main reason?
Memory, attention and decision processes	Is it something you do routinely (or do you make a deliberate decision to do this under certain circumstances)? Would you ever forget to do it?
Environmental context and resources	To what extent is you work environment conducive (or not) to collaborative goal setting? Is there a particular treatment package or resource you use? What resources do you use for this? To what extent do resources or that nature of your workplace (e.g. time, competing demands) influence whether you do it? Do you have enough time/do you have competing demands?
Social influences	Would your colleagues expect you to do engage in collaborative goal-setting? Is it generally accepted as good practice? Is collaborative goal-setting routinely conducted by your colleagues?(SLT and other colleagues) Do patients and their carers expect this?
Emotion	How comfortable are you in engaging in collaborative goal-setting? Is it challenging to do? Stressful? Uncomfortable? Would you prefer to avoid doing it? Is this behavior difficult to deal with? Would you prefer to avoid this behavior?
Behavioural regulation	Do you have a system for checking whether you have done it for relevant patients/carers? When you see patients with aphasia do you make a plan about when to complete goal-setting? Are there any protocols to facilitate the use of goal-setting? What would you need to do facilitate goal-setting?

Recommended practice 2: All stroke survivors and their families/carers should be offered information tailored to meet their needs using relevant language and communication formats. In patients with aphasia, all written information on health, aphasia, social and community supports should be available in an aphasia-friendly format. Information should be provided at different stages in the recovery process. Stroke survivors should be provided with routine, follow-up opportunities for clarification or reinforcement of the information provided.

Transition to next topic: Now I'm interested in hearing about what information you provide to stroke survivors and their carers and at what stage of the recovery process this happens.

1. Tell me about what you normally do.
- What information do you cover (health, aphasia, social/comm supports)?
- When? (Try to get a sense of how routinely they do it)
- How? In what format(s)?

2. What helps or hinders you from doing this as per the guideline recommendation? *(refer to guideline)*
    - Describe the factors that influence whether or not you provide aphasia-friendly information? (also ask information on tailoring it/how do they tailor?)

PROBES: ***I'd like to ask a few more questions about the factors that influence your practice***

TDF Domains	Prompt questions
Knowledge	How familiar are you with providing aphasia-friendly information? (also tailoring info) How familiar are you with the guideline recommendations on providing aphasia-friendly information? (also tailoring info)
Skills	How skilled are you at providing aphasia-friendly information? How skilled are you at tailoring information? How equipped do you feel… What training have you undertaken, if any, in relation to providing aphasia-friendly information?
Social professional role and identity	To what extent do you think providing aphasia-friendly information is part of your role? (to people with aphasia , family) To what extent do others in your workplace recognise this as part of your role? To what extent do you think it is your role to ensure all information provided to people with aphasia is aphasia-friendly?
Beliefs about capabilities	How confident are you in tailoring information to people with aphasia? Is tailoring information to people with aphasia easy or difficult to do? Explore Is providing aphasia-friendly information easy or difficult to do? Explore
Optimism	How optimistic are you that the patient's outcomes will be better if you provide aphasia-friendly information? How confident are you that (…. the desired goals will be achieved)?
Beliefs about consequences	What do you think the benefits are of providing tailored/aphasia-friendly information? (prompt for who?) What are the disadvantages of providing tailored/aphasia-friendly information? (prompt for who?) Do you think providing tailored/aphasia-friendly information is Important? Will lead to good/bad outcomes?
Reinforcement	What incentives are there for providing aphasia-friendly information? What penalties are there for not doing?
Intentions	How important do you feel it is to provide tailored/aphasia-friendly information routinely? Is it a high priority for you? Explore (Tell me a little bit more about that)
Goals	Tell me what motivates you to provide tailored/aphasia-friendly information? Why do you provide tailored/aphasia-friendly information? (or don't you)
Memory, attention and decision processes	Is it something you do routinely with people with aphasia (or do you make a deliberate decision to do this under certain circumstances)? Would you ever forget to provide tailored/aphasia-friendly information?
Environmental context and resources	To what extent is you work environment conducive (or not) to providing tailored/aphasia-friendly information? Is there a particular resource you use? What resources do you use for this? To what extent do resources or that nature of your workplace (e.g. time, competing demands) influence whether you provide tailored/aphasia-friendly information? Do you have enough time/do you have competing demands?
Social influences	Would your colleagues expect you to provide tailored/aphasia-friendly information? Is it generally accepted as good practice? Is tailored/aphasia-friendly information routinely provided by your colleagues? (SLT and other colleagues) Do patients and their carers expect this?
Emotion	How comfortable are you in providing tailored/aphasia-friendly information to people with aphasia? Is it challenging to do? Stressful? Uncomfortable? Would you prefer to avoid doing it?
Behavioural regulation	Do you have a system for checking whether you have provided tailored/aphasia-friendly information?

	When you see patients with aphasia do you make a plan about when to provide tailored/aphasia-friendly information? Are there any protocols to facilitate the provision of tailored/aphasia-friendly information?

Conclusion and De-briefing

- Is there anything else about the management of post-stroke aphasia that we haven't discussed that you think is important?

If time permits and only if these items have not yet been covered:

- *If you were trying to improve the management of aphasia and more routine use of these guideline recommended behaviours, what would you do to support therapists?*
- *Of the recommendations we spoke about today – which is most important to you/why??*

Appendix C-4. Chapter 6, Illustrative Quotes

Table S1: Factors that influence routine provision of ***tailored written aphasia-friendly information*** with follow-up opportunities at all stages of recovery

BaSP = base-grade speech pathologist, SeSP = senior speech pathologist, MaSP = speech pathology manager;
Acute = Acute setting, Comb = Combination of acute and rehabilitation settings, Rehab = rehabilitation setting;
Metro = Metropolitan/RA1* (Major City), Regional = RA2* (Inner Regional) * Australian Standard Geographical Classification – Remoteness Areas

Key Domain	Theme	Subtheme	Representative quotations
Environment context and resources	Resources	Lack of appropriate pre-packaged resource for acute setting	"*There's quite a bit of information, I think that's why we wanted to go through with the NSF and sift through what's actually the most relevant because it's obviously a very overwhelming time for patients*." (ID01:SeSP, Comb, Metro)
		Available resources not 'aphasia-friendly'	"*So I think that is definitely a gap… in actual printed aphasia-friendly handouts for the person with aphasia*." (ID06:SeSP, Rehab, Metro) "*They are not terribly aphasia friendly...I think they're family friendly, or they're layperson friendly, but I think that there would need to be modification to make them aphasia friendly*." (ID01:SeSP, Comb, Metro)
		Resources have been developed that can be tailored to a patient's needs	"*I've been doing also a communication – it's almost like an education, but, like a little workshop, runs for about an hour, with people's family and friends, whoever can come*." (ID03:BaSP, Rehab, Metro) "…*I have also created some other things as necessary*." (ID06:SeSP, Rehab, Metro)
	Time	Lack of time to develop resources	"… *I don't have the time to develop a resource just...to work with*." (ID01:SeSP, Comb, Metro)
		Lack of time to provide information	"*I suppose it's a time constraint thing that the family is there and they're asking questions, let's have a chat and get this done, rather than saying I'll get you a handout and I'll leave that with you and you have a look at that and tomorrow we'll discuss it a bit more. I tend to just address things now and take that opportunity when it's there*." (ID18:SeSP, Acute, Metro) "*I suppose the biggest barrier I can think of is the time factor*," (ID19:SeSP, Comb, Metro)
	Competing demands	Competing demands such as providing support may take higher priority than providing education	"*In the acute phase I'm just so focused on supporting them there and then, but I'm not like 'You have aphasia. This is what we're going to do. These are all the supports out there for you.' I'm just like 'How can I get you to communicate*?'" (ID11:BaSP, Comb, Metro)

	Physical Environment		"*One of the barriers in acute is that it can be hard to get rid of distractions...it's, you're in a 4 bed room, there's lots of noise, there's lot of distractions and don't always have the luxury of having a private space which would make it easier for that person to understand. That's probably the biggest thing. That and the time*." (ID01:SeSP, Comb, Metro)
	Access to patient and/or family	Difficulty accessing family to provide information	"*I think definitely capturing families whilst you're here, I think the timing… um, we've had quite a few younger um, strokes as well. So sometimes when the carer might also be working, so they might only be able to visit at a time that we're not here*." (ID06:SeSP, Rehab, Metro)
	Organisational culture	Often acute organisational focus is on discharge or transfer to rehabilitation	*"I think that's a different mindset over there (in the acute setting) ...get them better, get them to, you know, medically stable."* (ID20:BaSP, Acute, Metro)
	Structure and complexity of role	Clinicians working across several different settings may find it more challenging due to the structure of their role	"*Because I don't work in the rehab unit all of the time I actually don't know what processes they've implemented at the moment for the patient and staff*." (ID19:SeSP, Comb, Metro)
	Critical incidents	There have been critical incidents/salient events when information hasn't been understood by patients with aphasia	"*He thought that he was going home for good. And so yesterday he was in tears and absolutely beside himself, because he didn't understand that it was a home visit and he would be coming back to hospital afterwards*." (ID01:SeSP, Comb, Metro)
Key Domain	**Theme**	**Subtheme**	**Representative quotations**
Beliefs about Consequences	Beliefs about effectiveness and/or outcomes for patients	Lack of conviction about the effectiveness of providing information in the acute phase.	"*I wouldn't necessarily say that it's going to improve their outcomes, I'm not sure on that*." (ID18:SeSP, Acute, Metro).
		Beliefs that patients don't want information and/or that they won't remember it in the acute phase	"*He's had that information from the get go but he just wasn't well enough to take it in*." (ID19:SeSP, Comb, Metro). "*I think sometimes in that acute phase people maybe don't want to get some of that information so that can be a barrier and sometimes I think I don't need to worry about that yet, I don't think this family wants all those details at this stage and you just hope that some more education will happen down the track when you're in rehab or something like that*." (ID18:SeSP, Acute, Metro).

		Beliefs that information needs to be provided that is relevant to patients in order to be useful	"*I do get very aware that they might be overwhelmed with it, so I tend to give less information or only the key, critical information, I should say*." (ID01:SeSP, Comb, Metro).
		Patients have a right to accessible information	"I think it's better to tell them what it is 'cause they have a right to know what it is." (ID01:SeSP, Comb, Metro)
		Beliefs that providing patients with information makes their hospital stay easier	"*It's not necessarily that my priority is to give information about aphasia, the diagnosis, the prognosis, etcetera; it's that I want to use aphasia-friendly materials to make their journey in hospital easier for them*." (ID01:SeSP, Comb, Metro)
		Providing information is beneficial to patients as it reassures them	"*I would give that (verbal) feedback often in the emergency department because I think that actually offers some people some reassurance*." (ID19:SeSP, Comb, Metro) "*I think it has a good impact on the patient's level of anxiety and confidence, kind of understanding their own aphasia…then, you know, having realistic expectations about recovery and things like that*." (ID06:SeSP, Rehab, Metro)
		Providing information to families can improve their communication with the person with aphasia	"*So we do that (family workshop), which I think is great. I love that, I think it makes a difference*." (ID03:BaSP, Rehab, Metro)
	Anticipated regret	Beliefs that negative outcomes could occur if information is not provided	"*Well, they wouldn't know what was going on, they wouldn't know why it was happening, they wouldn't know that there are other people out there that have had the same thing happen."* (ID10:BaSP, Rehab, Regional)
Key Domain	**Theme**	**Subtheme**	**Representative quotations**
Social Influences	Patient and family expectations and priorities	Patients are not always ready to receive information (overwhelmed or distressed)	"*…they're just too drowsy, too confused, to take any of that in."* (ID20:BaSP, Acute, Metro) "*Sometimes you want to provide information and you go in and the patient's just not in the right frame of mind to receive information…sometimes they're crying, or they're in tears or they're exhausted.*" (ID01:SeSP, Comb, Metro)
		It is often not an expectation or priority for patients and/or families to receive information	"*Often I'll give the person a choice whether they want written information or not, most people actually they don't actually want it*." (ID19:SeSP, comb, Metro) "*He can't walk, that's all that matters…Different patients and different families have different priorities."* (ID18:SeSP, Acute, Metro).

			"*I think that they often have questions, but they're not necessary expecting… um, handouts. And I've had, I have, you occasionally get some family members that when you offer them stuff they're not really, they're not interested*." (ID06:SeSP, Rehab, Metro)
	Staff and/or colleague expectations	Inconsistency between SPs in what constitutes aphasia-friendly resources	"*I don't think it's consistent among clinicians as to what actually constitutes aphasia-friendly*." (ID01:SeSP, Comb, Metro)
	Leadership	Lack of support and leadership in developing aphasia-friendly resources from external organisations (e.g., NSF)	"*We did, as a team, recently um request review of some of the documents, prior to accreditation happening, um, through (speech pathology leadership group), and there was a bit of, I think there was a bit of resistance to getting them reviewed."* (ID01:SeSP, Comb, Metro) "*They've (NSF) got all these handouts which are fabulous… are they contemplating making their current handouts aphasia friendly? They kinda said, they'll think about it*." (ID06:SeSP, Rehab, Metro)
		Lack or presence of leadership within MDT in providing stroke education	"*Within the acute stroke phase, we have a roster within the multidisc team, for giving out the stroke information packs...um, it's a process that hasn't been refined yet, and we're not consistently doing it.*" (ID01:SeSP, Comb, Metro) "*Stroke education has been something that the unit as a whole have trying to overhaul in the last six months or so*." (ID19:SeSP, Comb, Metro) "*Our OT hands out a stroke pack to all patients that are referred under our stroke team referral.*" (ID18:SeSP, Acute, Metro)
Key Domain	**Theme**	**Subtheme**	**Representative quotations**
Knowledge	Theoretical knowledge	Lack of familiarity with guideline recommendations for information provision	"*I wouldn't say that I'm intimately familiar with them* (NSF recommendations)." (ID01:SeSP, Comb, Metro)
		Familiarity with underlying evidence	"*…there's still evidence out there that providing that information at different points through the, you know, through the pathway and at different points in the recovery is beneficial…*" (ID10:BaSP, Rehab, Regional)
	Knowledge of the task environment	Lack or presence of knowledge of what resources are available and where to find them	"*They're quite hard to locate as well. I wouldn't even know how to access those network pamphlets. I'd have no idea*." (ID16:SeSP, Acute, Metro) "*The handouts we've got are a fairly broad collection from all of the places that we've worked*," (ID10:BaSP, Rehab, Regional)

		Familiarity with content in National Stroke Foundation's My Stroke Journey package	"*I'm not very familiar with the content of them yet, because I haven't had to go through it with a patient yet,"* (ID01:SeSP, Comb, Metro) "*I think there's a four page booklet to be honest I haven't looked at it ages so I really feel like I'm probably not that aware of what's in it*." (ID18:SeSP, Acute, Metro)
	Procedural knowledge	Limited knowledge about how to modify information to be 'aphasia-friendly'	"*... I wouldn't feel confident in putting something (aphasia-friendly) together without more of a guideline*." (ID01:SeSP, Comb, Metro)
		Good knowledge about how to modify information to be 'aphasia-friendly'	"*…lots of white space, highlight the key words, short sentences, don't overcrowd the page it's just, like,* burned *in there*." (ID10:BaSP, Rehab, Regional) "*I certainly am somewhat aware of some of the suggestions for making things aphasia friendly and I've certainly seen some other documents that are aphasia friendly and I understand the concept*." (ID18:SeSP, Acute, Metro)
		Lack or presence of knowledge about whose responsibility it is to deliver stroke information	"*See this is where I get a little bit confused. We have like a stroke book kind of pack that we give patients but I don't know who does that or where it comes from or who gives that information or whether they're communicating in a way that the patient understands*." (ID11: BaSP, Comb, Metro)
Key Domain	**Theme**	**Subtheme**	**Representative quotations**
Beliefs about capabilities	Self-confidence	Lack or presence of confidence and perceived competence in creating aphasia-friendly resources	"*That's probably another reason that we don't have aphasia-friendly resources and things because I wouldn't feel completely confident in my ability to prepare something like that*." (ID18:SeSP, Acute, Metro) "*I suppose fairly confident. I mean… verbally I feel like I can explain things in, for the patient in terms of actual, tangible material, getting my hands on stuff there and then. Um, but then I have also created some other things as necessary*." (ID06:SeSP, Rehab, Metro)
		Not confident to put label on 'aphasia' in acute if no formal ax	"*I think I would definitely use it (the word 'aphasia') once we've gone through all of the formal assessments. I guess when it's so early sometimes we don't know*." (ID199:SeSP, Comb, Metro) "*Sometimes I don't feel justified in giving it a label if I haven't really actually done anything assessing and diagnosing that*." (ID18:SeSP, Acute, Metro)
	Self-efficacy	Do not find modifying information to be 'aphasia-friendly' difficult.	"*…we had to have a big family meeting to talk about a very complex discharge planning. And so I'd seen, I think it's some of the Kagan supported conversation. There's a document already that talks*

			about capacity. Capacity and consent and so there are a few things from there, so I kind of modified that and created a slightly different one to use in the family conference." (ID06:SeSP, Rehab, Metro)
	Empowerment	Feel comfortable doing it despite patients becoming upset or not expecting it	"*I mean there are some families I'll offer it to and they don't want it and that's fine …it doesn't really put me off too much, I'm used to patients not wanting a bar of me*." (ID06:SeSP, Rehab, Metro)
	Perceived behavioural control.	Find it difficult to provide information to patients with severe or receptive aphasia	"*It can be really tricky with people with receptive language deficits, in a...that are quite severe*." (ID03:BaSP, Rehab, Metro).

Table S2: Factors that influence speech pathologists' routine provision of ***engaging in collaborative goal-setting with people with aphasia and their families***

BSP = base-grade speech pathologist, SSP = senior speech pathologist, MSP = speech pathology manager;
Acute = Acute setting, Comb = Combination of acute and rehabilitation settings, Rehab = rehabilitation setting;
Metro = Metropolitan/RA1* (Major City), Regional = RA2* (Inner Regional) * Australian Standard Geographical Classification – Remoteness Areas

Key Domain	**Theme**	**Subtheme**	**Representative quotations**
Environment context and resources	Resources	Lack of appropriate resources to use with PWA	"*Particularly with an aphasic patient who can't really communicate, it's hard to use any of those formal things*." (ID04:SeSP, Comb, Metro). "*Um, in terms of people with really severe deficits, um, I still don't really know. I've got that AFROM...but that's not very helpful in honesty. It's helpful with people who are higher level, but it's too complicated to explain for someone with, like, Wernicke's...um, so that's not been helpful*." (ID03:BaSP, Rehab, Metro).
	Time	Lack of time to engage in goal setting in the acute setting	"*So it seems like we're trying to manage this acute caseload we don't really have time as well to just sit down and nut out some goals which is sad but reality*." (ID14: SeSP, Acute, Metro) "*I've found it really hard to find the time to go and revisit goals."* (ID01:SeSP, Comb, Metro)
		Lack of time to use formal goal-setting tools	"*I know you've got things like the IFCI and those sorts of more formal ones...I often find it difficult when they're really long like that, 'cause you've just done a CAT, then you've done some PALPA, then you've done something else, and it's like "Ooh, let's pull out another assessment to goal set!"*." (ID04:SeSP, Comb, Metro).

	Competing demands	The acute caseload is busy and there are higher priorities such as assessment or new referrals.	"*We're not really establishing goals for the patient. The main goal is to essentially get formal assessment commenced…The other hard thing is that being an acute service you can't commit to a regular time with the patient either. So you can't guarantee that you're going to actually come for therapy if you've got five ICU referrals. That was my well-intended aim to get there but…"* (ID14:SeSP, Acute, Metro)
	Access to the patient and family	Ability to access family and the level of support provided by family	"*For those patients where the families are really well involved, it does make like a lot easier. So where we've had really supportive families that's really helped us to integrate and set some better goals*." (ID04:SeSP, Comb, Metro)
		Difficulty accessing patient to provide information to engage in goal setting	"*Because we don't have MRI on site either, so if a patient has to go off for MRI they're gone for most of the day and that's a whole day that we're not able to assess them or do anything with them and then when they do come back again they're tired, it's tricky."* (ID14:SeSP, Acute, Metro)
	Organisational culture	Often organisational focus is on discharge rather than asking the patient what they want to achieve	"*There's no time to review the goals, there's no time to reset the goals, and then before you know it they're talking about discharging the patient*…" (ID 01:SeSP, Comb, Metro) *"…so they (the doctors) might come in and say you're speaking much better today but (…) they're actually really quite struggling. They brush over it a little bit and get back on to where they're making the bigger gains or the gains that they need discharged I think and that's probably more to the point."* (ID15:SeSP, Rehab, Metro)
	Structure of role and staff support	Seen as important to have a structure in place to support staff being able to do it	"*We will tend to have rotating new grads come through the unit, so we'll take on a new grad each year, so having better structure, so that we can ongoingly support good goal setting, and the way to ask questions and have pictorial guides and have sort of strategies in place to then support good goal setting*." (ID04:SeSP, Comb, Metro)
Key Domain	**Theme**	**Subtheme**	**Representative quotations**
Beliefs about Consequences	Beliefs about effectiveness and/or outcomes for patients and/or families	Beliefs that patients need to know what they are working towards	"*It gives them something to focus towards*." (ID04:SeSP, Comb, Metro) "*I think it would be good for the patient to do it and the family to see what we're actually working on and to set them up with stuff that they can be doing in between or what we're trying to achieve."* (ID14:SeSP, Acute, Metro)
		Not convinced that collaborative goal setting will improve outcomes	"*He's going improve with or without goals. That's what I think*." (ID16:BaSP, Acute, Metro)

		Reviewing goals is important when it comes to discharge	"*I think if there was more a forum to regularly catch up about goals, some of the distress at that point in time could almost be avoided a little bit*." (ID 01:SeSP, Comb, Metro)
		Beliefs that the process is not always in the best interest of the patient and may 'burden' them	"*I don't want to overburden them with trying to think of all the things that they want to be able to achieve*." (ID 01:SeSP, Comb, Metro)
		Beliefs that family are not always wanting to participate in goal setting in the acute phase as they are too overwhelmed	"*Actually I guess being the 50th person to call the family and they've just found out their family member has had a stroke… it's all a bit overwhelming*." (ID14:SeSP, Acute, Metro)
	Beliefs about effectiveness and/or outcomes for clinicians themselves	Beliefs that 'good' goals are helpful in structuring therapy – make it easier for clinician	"*The better you set the goals, and the better directed and um, um...I don't know. It's easier to plan exactly what your therapy block will look like in terms of intensity, in terms of service-delivery, if you've got that really good goal. Yep*." (ID03: BaSP, Rehab, Metro)
		Belief that it provides a rationale for therapy priorities	"*If we have those really good goals and they're really collaborative, then so long as you're targeting their priority area above others and proportionately spending your time on that, then that's what's going to work."* (ID03:BaSP, Rehab, Metro)
		Not convinced that it is the best use of the SP's time in the acute stage	"*Because they're so acute they do change so it's like I'm spending all this time putting together goals and therapy and it might not actually be relevant the next day or after the weekend*" (ID14:SeSP, Acute, Metro)
	Anticipated regret	Beliefs that negative outcomes could occur if the clinician doesn't engage in collaborative goal setting	"(If you didn't do it) *The patient wouldn't know what to expect. They wouldn't really know what they're working on, and I think they'd probably feel a bit more disengaged because they haven't identified what they want to work on*." (ID01:SeSP, Comb, Metro)
Key Domain	**Theme**	**Subtheme**	**Representative quotations**
Social Influences	Patient and family expectations and priorities	Family support can facilitate collaborative goal setting	"*For those patients where the families are really well involved, it does make like a lot easier. So where we've had really supportive families that's really helped us to integrate and set some better goals*." (ID04:SeSP, Comb, Metro) "*If you don't have that family's collateral, it can feel very...um, can feel very without any direction, if the person also has a communication disorder.*" (ID03:BaSP, Rehab, Metro)
		It is often not an expectation or priority for patients and/or	"*Sometimes with older patients and with older families, they expect you to set the goals for them…because they've never actually taken ownership of their own health before. And they feel really*

		families to engage in goal setting, particularly in acute setting	*vulnerable being in hospital, and they just want to be told what to do in many ways*." (ID01:SeSP, Comb, Metro) "*I guess often patients and family assume the clinician should choose the correct goals. So it's no need to be discussed. Like I'm not gonna start working on comprehension if their comprehension is one hundred percent…and like families don't push for it, neither does the patient*." (ID16:BaSP, Acute, Metro) "*I think that happens for a lot of those stroke – particularly aphasics because they are your bigger strokes often and there's a whole lot going on for the patient and the family. Sitting down and working out where we're going to go in the future is not really on that radar in that very acute phase."* (ID12:SeSP, Acute, Regional)
		Patients don't want to spend too much time on anything that isn't direct therapy	"*And by that time, the patient's like, "I've been in here for a week and you still haven't done any therapy, can we actually have a reason for being here please?*" (ID04:SeSP, Comb, Metro
		SPs are influenced by their perceptions of whether patients want to engage in speech therapy and goal setting	"*Even though he never said, "I want to work on my communication to express my wishes to my family around what happens with my house," I was like, "I'm pretty sure that's his goal" so we just worked on that*." (ID03:BaSP, Rehab, Metro)
	Staff and/or colleague expectations	Collaborative goal setting is the norm in the MDT in rehabilitation	"*Once a week, we review patient goals, we review, um...you know, where they're at from all disciplines*," (ID03:BaSP, Rehab, Metro)
		Collaborative goal setting is not typical practice in acute care and is not expected by others in the team	"*You know clinicians should write goals. No one does it. No one does it*." (ID16:BaSP, Acute, Metro) "*I think it's looked at as something that it's great to have and we could aim for, but if you don't have it no one is judged or looked down upon for it*." (ID04: SeSP, Comb, Metro)
	Leadership	There can be a lack of leadership in the MDT and unclear expectations	"*Because no-one in our team is designated to be leading that role... and I think no-one really wants to own that, either*." (ID01:SeSP, Comb, Metro) "*There is no focus on goals.*" (ID16:BaSP, Acute, Metro)
Key Domain	**Theme**	**Subtheme**	**Representative quotations**
Goals	Goals	Goal of SP department is to review goal-setting procedures	"*Improving that goal setting process is part of that next step*." (ID04:SeSP, Comb, Metro)

			"*I guess it was helping us step up our goals, set down our goals and see if we could show that what we were doing was actually making a difference for the patient. Just having something a little bit more transparent. It's something that hasn't been happening but it was the general idea that we could try and do something with the patients like that*." (ID14:SeSP, Acute, Metro)
	Action Planning	Awareness it is an area for improvement	"*(Goal setting is) something I'm working on*." (ID03:BaSP, Rehab, Metro)
Key Domain	**Theme**	**Subtheme**	**Representative quotations**
Beliefs about capabilities	Self-confidence	Lack of confidence and perceived competence for inexperienced SPs	"*Because being inexperienced in general, it's hard to know what is a realistic goal until you've...I don't know, got some mileage under what people can achieve, maybe*?" (ID03:BaSP, Rehab, Metro)
		Experience can facilitate confidence	"*Experience really helps with that, 'cause otherwise patients are coming up with, or the families more often, are coming up with things...quite unrealistic goals and you've then got to try and piece them apart and filter them down to something you can work on*." (ID01:SeSP, Comb, Metro)
	Self-efficacy	Find the process of setting realistic goals challenging	"*I've found it tricky thinking about where they are in the hospital at the moment, what's functional for them in the hospital versus what's functional for them at home*." (ID03:BaSP, Rehab, Metro)
	Empowerment	Disempowered to provide aphasia services including goal setting as dysphagia is a priority	"*I feel like I work more in acute, and I hate it, but I feel like I've become more of a dysphagia therapist ... never thought that would happen but, I think it has...I feel like I'm not very fresh with all the different techniques and all the different approaches*." (ID01:SeSP, Comb, Metro)
	Perceived behavioural control.	Goal setting is challenging to do with PWA, particularly with those that are severe	"*Sometimes that insight into their deficits especially if it's right hemisphere or really quite significant impairments as well so they're not having that insight or that capacity to be able to explain what they would like to achieve as well."* (ID15:SeSP, Rehab, Metro) "*It depends on the severity of the aphasic person that goal setting can be really challenging*." (ID04:SeSP, Comb, Metro)
		PWA find it difficult to engage in collaborative goal setting, which in turn makes it difficult for the SP	"*…you can't just ask a patient, "What is your goal?", because I can pretty much guarantee you what it's going to be, it's going to be down to …"I want my talking better, I want to be able to talk normally*…"(ID 04:SeSP, Comb, Metro)
		Difficult to prioritise goal setting due to competing demands	"*The hardest thing here - well, staffing capacity, um, caseload..."* (ID01:SeSP, Comb, Metro)

Table S3: Factors that influence speech pathologists' routine provision of ***providing therapy to people with aphasia as early as tolerated***

BaSP = base-grade speech pathologist, SeSP = senior speech pathologist, MaSP = speech pathology manager;
Acute = Acute setting, Comb = Combination of acute and rehabilitation settings, Rehab = rehabilitation setting;
Metro = Metropolitan/RA1* (Major City), Regional = RA2* (Inner Regional) * Australian Standard Geographical Classification – Remoteness Areas

Key Domain	Theme	Subtheme	Representative quotations
Environment context and resources	Resources	Lack or presence of appropriate assessment and therapy resources are available	"*So a lot of the paper-based resources and books and picture cards and all that are all really easy to use on the ward*." (ID07:BaSP, Comb, Metro) "*We don't have any funding for resources through the hospital or through the speech pathology department for aphasia assessment or therapy. We still have our very old tests that aren't always relevant."* (ID14:SeSP, Comb, Metro)
		Availability or lack of technology to facilitate earlier therapy	"*We don't have a lot of access to technology. We are getting some iPads apparently*." (ID07:BaSP, Comb, Metro)
		Lack or presence of Allied Health Assistants to provide therapy	"*The AHAs are a big facilitator*." (ID11:BaSP, Comb, Metro)
	Time	Lack of time to provide early therapy	"*The pressure is that time constraint*." (ID18: SeSP, Acute, Metro). "*I guess, you know, giving therapy is time consuming when you have...um, a lot of patients on your caseload*." (ID07:BaSP, Comb, Metro)
		Lack of time to develop therapy plan for Allied Health Assistants	"*My time is probably a big barrier. If I don't have time to see them and I have to write up an AHA therapy plan, the time that I've got to actually dedicate to write that up in a way that's easy for the AHAs to navigate*." (ID11:BaSP, Comb, Metro)
	Competing demands	Competing caseload demands with new dysphagia referrals given higher priority, particularly when balancing both acute and rehabilitation caseloads	"*Often a new referral will come through and that patient might be nil by mouth and that unfortunately is just going to take priority over someone with aphasia*." (ID14:SeSP, Comb, Metro). "*Competing demands in that, um, if we have a huge amount of referrals and need to get through them all*." (ID08:SeSP, Comb, Metro)
	Funding, Staffing and	Lack of sufficient funding for staff to spend enough time with	"*We're not ward specific which also makes it hard so there's not someone up on the stroke unit all day even though we get 0.5 funding we're still servicing other areas of the hospital that we're not necessarily funded for because there's still a need for that service*." (ID14:SeSP, Comb, Metro).

	Caseload Structure	people with aphasia/stroke caseload	
	Physical Environment	Acute environment not conducive to conducting therapy	"*I just think environmentally there's challenges around that... it's really suboptimal to try and do assessment in a 4 bed room at bedside... it's you know, it's so challenging, there's noise, there's distractions."* (ID01:SeSP, Comb, Metro). "*It's so noisy up there and it's hot up there there's still no air conditioning. It's just a really noisy and really distracting environment which doesn't help*." (ID14:SeSP, Comb, Metro).
	Access to patient and family	Difficulty accessing family	"*I suppose family as well... could, can be a barrier, particularly - not so much presence of family but difficulty with contacting them.*" (ID07:BaSP, Comb, Metro)
		Access to therapy can facilitate more personally relevant therapy	"*Yes, (having family present for therapy helps make it) personal and relevant*." (ID14: SeSP, Comb, Metro).
		Difficulty accessing patient for therapy due to medical tests and other professionals seeing the patient	"*One barrier I usually find the first day we get a stroke team referral is the fact that that referral goes out to all of us and we will all pounce on this poor patient (…) trying to see our new referrals first thing."* (ID18:SeSP, Acute, Metro). "*It's really difficult, especially when they're still in the acute phase, too, to get them at a time when they are not with Physio or OT or not off getting a brain scan*" (ID07:BaSP, Comb, Metro) "*I think the biggest thing is that there's so many people trying to get to the patient*," (ID01:SeSP, Comb, Metro).
	Organisational culture	Organisational culture that aphasia is not a priority in the acute setting	"*The barriers are still um, resources and culture and recognition of the, um...real clinical risks associated with...I don't, I don't think that's really, um, understood by many people. They think its fine to leave an aphasic patient just sitting there...for, you know, getting half an hour, 2 times a week, it's no worries. When, they don't, they don't recognise, too, like this stuff that's coming out about, you know, medication errors, and readmission*," (ID08:SeSP, Comb, Metro)
		Often organisational focus is on discharge and aphasia is not given priority	""*Like I wonder sometimes if the doctors aren't looking TOO far, 'cause they need to clear beds…The constant, um...like constant, constant bed pressures, like they just want to send everybody home, and, like that's ok, we might be able to get them in for outpatients, but um...we might not*". (ID08: SeSP, Comb, Metro)
	Systems and patient flow	Delayed access to rehab beds	"*Although it's better than it used to be, patients are still sitting on the acute ward longer than we'd like them to, sometimes even a couple of weeks*." (ID18: SeSP, Acute, Metro).

		Reliance on referral systems to identify people who might have aphasia	"*It does rely on people effectively detecting, um...that they've got communication problems*." (ID08: SeSP, Comb, Metro)
Key Domain	**Theme**	**Subtheme**	**Representative quotations**
Beliefs about Consequences	Beliefs about effectiveness and/or outcomes for patients	Beliefs that patients need therapy early in order to prioritise their aphasia and plan discharge and rehabilitation needs	"*probably, the most crucial thing sometimes is to work out what's wrong with them to tell the doctors and advocate for their needs, and then maybe...like, if you're trying to look at their journey so that they don't miss out on, um, getting to rehab or get overlooked or get sent home without being flagged for outpatients*." (ID08:SeSP, Comb, Metro) "*…a huge benefit to starting early because at least everyone is in on it, knows what's going on*. " (ID18:SeSP, Acute, Metro)
		Beliefs that patients benefit from early therapy for aphasia	"*If it's possible, you really need to get in early to start the ball rolling*." (ID07:BaSP, Comb, Metro) "*I just think that if you start early in my mind, they're more likely to be more motivated. You are pushing them from the beginning. You get their family involved really early*." (ID11:BaSP, Comb, Metro)
		Not convinced that early therapy will benefit all acute patients	"*I tend to sort of think that if they're not really engaged, they're too tired, I don't know if we're going to get the gains that we are wanting to see anyway... I don't think for every patient it would necessarily improve their communication outcomes*." (ID01:SeSP, Comb, Metro)
		Belief that a lack of early therapy has no negative consequences for patients	"*I don't think it would have a negative impact (not having therapy) but it just might not provide them with the insight or help them through that acute phase as much as if it would if they did have a little bit of therapy. I think it would be one of those things that it's like no difference if nothing happens, but if they do get it it's a bonus."* (ID14:SeSP, Acute, Metro) "*I don't like to think that it would detrimental to the patient because that makes me feel really bad (…) It doesn't have to be early. It's not early or nothing, but I'm optimistic that early is better if that makes sense*." (ID11:BaSP, Comb, Metro)
		Belief that starting therapy too much soon could be detrimental to patients in acute	"*…interfering with that too early can have negative effects on not just communication but general outcomes, and there's no clear timeframe as to when it would be beneficial versus when its um detrimental...*" (ID01:SeSP, Comb, Metro)
	Anticipated regret	Anticipated regret that patients may not have access to services on discharge	"*But she's probably going to sit on a waiting list somewhere or not get very regular or intensive therapy*." (ID18:SeSP, Acute, Metro)

		Anticipated regret that a lack of SP involvement could lead to adverse outcomes in hospital	"*So many negative consequences happen in hospitals because people can't communicate their needs properly…*" (ID07:BaSP, Comb, Metro)
		Anticipated guilt if couldn't provide therapy	"*Also when you're handing over to someone when that patient is going to rehab I would feel really embarrassed and uncomfortable to have to say there's a lot to do there and I didn't even start, I haven't done anything yet…*" (ID18:SeSP, Acute, Metro)
Key Domain	**Theme**	**Subtheme**	**Representative quotations**
Social Influences	Patient and family expectations and priorities	Families may or may not expect therapy to be provided in acute	"*I think families have a certain expectation that you'll be checking in regularly, and I think they just want to know when you're coming back next*." (ID01:SeSP, Comb, Metro) "*I've never asked to be honest, if it was my family I would be (expecting it).*" (ID14:SeSP, Acute, Metro)
		Family support can facilitate therapy in acute	"*I think social support is a big facilitator. If they've got a family member there coercing them into doing therapy when they're maybe a bit tired, do you know what I mean?"* (ID11:BaSP, Comb, Metro)
		Patients may expect to receive therapy in the acute setting	"*…patients who are really motivated and keen to get going, I'd definitely start on day two or three with therapy*." (ID21:BaSP, Comb, Regional)
	Staff and/or colleague expectations	MDT and nursing staff supportive of SP role in providing early treatment to PWA	"*I think it's very much expected of me by the other disciplines, nursing staff, family members, the patients themselves. I find that there's that impression of, "they're not talking properly, what are you going to do about it?" right from that very early stage*." (ID18:SeSP, Acute, Metro) "*MDT and the nurses have been really receptive to, to training that we've offered around, um detecting patients with communication impairment*." (ID08:SeSP, Comb, Metro) "*Our stroke physician is really pro speech pathology so that really helps*." (ID14:SeSP, Acute, Metro)
		Colleagues can pressure SP to provide early therapy	"*And so I get a very strong sense of, people (MDT) want programs reviewed more regularly than we can review them, um, people want therapy at times that we just haven't got set aside to provide it*." (ID01:SeSP, Comb, Metro)
		Colleagues understanding that it is not always possible to provide therapy due to staffing	"*I think it is (expected) but I think it is with the understanding that if it doesn't happen it's not because they didn't want it to or I didn't try hard enough. It's expected if we have capacity and if we just don't have capacity then that's okay*." (ID11:BaSP, Comb, Metro)

		Lack of support from other health professionals who may not see aphasia as being a priority, particularly if it is the only impairment	"*The rehab physician assessed her she then called me and said "I don't want to fill up a rehab bed for a patient that just needs speech*." (ID18:SeSP, Acute, Metro) "*I was really concerned once she'd been discharged physio and the OTs weren't saying they really wanted or felt she needed to be here, I was really concerned that they'd discharge her because that has certainly happened to us before. It's just speech (so) they can go home*." (ID18:SeSP, Acute, Metro)
	Leadership	SP seniors support and encourage base-grade clinicians	"*I feel confident in the fact that I always do have someone to ask, and a really knowledgeable supervisor and senior working in the area that I can always bounce ideas off, and other members of the department as well* (…) *we're always encouraged to try with everyone*." (ID07:BaSP, Comb, Metro)
Key Domain	**Theme**	**Subtheme**	**Representative quotations**
Social/Professional Role and Identity	Role to advocate	It is the role of the SP to advocate for rehab or therapy services for people with aphasia	"*So I was really pushing for her to go to rehab*." (ID18:SeSP, Acute, Metro)
	Role to provide therapy	Belief it is the role of the SLP to provide early therapy for aphasia	"*I think it's a huge part of my role*." (ID18:SeSP, Acute, Metro) "*I think definitely part of our role*". (ID01:SeSP, Comb, Metro) "*I think it's a huge part of our role*" (ID07:BaSP, Comb, Metro)
Key Domain	**Theme**	**Subtheme**	**Representative quotations**
Beliefs about capabilities	Self-confidence	Lack of self-confidence in providing therapy, particularly in complex patient	"*And there's so many factors that you have to think of with the patient that sometimes you're just going in and thinking, "Oh, I'll just give this a go and see what happens," And…yeah, like "I don't know if this is working". You know. "The progress is slow. Is that just because they're… that's how they are or is it because I'm not doing the right thing?"* (ID07:BaSP, Comb, Metro) "*I guess sometimes if a patient is so severe or there's so many areas breaking down what am I going to pick to focus on first?"* (ID14: SeSP, Acute, Metro)
		Increased confidence in providing acute therapy when working in that setting more	"*I'm definitely a lot more confident than when I first started*." (ID 07:BaSP, Comb, Metro)
	Self-efficacy	Self-belief in ability to overcome challenges	"*I find it a little bit challenging if they're not responding the way I anticipate them to (…) But as the patients become similar and I can kind of map them, I really take from that PBL (problem-based)*

			learning style that we did. Then I can navigate the situation a little bit easier." (ID11:BaSP, Comb, Metro)
	Empowerment	Lack of empowerment in building confidence in aphasia management	"*I personally feel like I'm not very good at rehab, because I have never been in a caseload where I've been able to do enough of it to get confident*." (ID01:SeSP, Comb, Metro) "*I'd love to be able to know as much and be able to do as much with that as I feel I can do with dysphagia and head and neck because that just seems to be what I understand more. Sometimes it frightens me and makes me feel like I don't like it because I don't feel like I'm able to provide a good enough service (to people with aphasia)*." (ID14: SeSP, Acute, Metro)
	Perceived behavioural control.	Sense of control over caseload management	"*No one else is saying here's your list these are the patients that need to get seen, I've got complete control and therefore flexibility to do whatever.,."* (ID14:SeSP, Acute, Metro) "*I guess again the luxury of having been here by myself for so many years I've just done what I want really."* (ID18:SeSP, Acute, Metro)
		Perceived behavioural control over environmental barriers such as staffing and funding	"*And it's really hard to sort of say, 'Well, actually, someone's off sick today and I'm on the ward and I have to go to ED, so no I can't do that, sorry'*" (ID01:SeSP, Comb, Metro)
		Heterogeneity of aphasia makes therapy challenging	"*So it's different for everyone, I think that's why it's so hard with aphasia*." (ID17:MaSP, Comb, Metro)

Table S4: Factors that influence speech pathologists' routine provision of ***providing as much therapy as possible to people with aphasia***

BaSP = base-grade speech pathologist, SeSP = senior speech pathologist, MaSP = speech pathology manager;
Acute = Acute setting, Comb = Combination of acute and rehabilitation settings, Rehab = rehabilitation setting;
Metro = Metropolitan/RA1* (Major City), Regional = RA2* (Inner Regional) * Australian Standard Geographical Classification – Remoteness Areas

Key Domain	Theme	Subtheme	Representative quotations
Environment context and resources	Resources	Lack or presence of appropriate therapy resources available	"*I mean there are things I'd like. I mean there's resources in the UK that I'd really love to have here…there's a program called* ***'React'.*** *It's so useful. I've asked for it but it's quite expensive."* (ID13:SeSP, Rehab, Regional)
		Use of home programs to facilitate more intensive therapy	"*We supply them with a program (…) then the OT's will set them up with either our program while they're in the stretch (session)...just to try and get a bit more intensity*." (ID09:SeSP, Rehab, Regional) "*We get families involved if they feel that they can take on board some of those activities."* (ID01:SeSP, Comb, Metro)
		Availability or lack of technology to facilitate more intensive therapy	"*There's a therapy computer we've got React2 set up on. So allowing patients to come in there and use it whenever they like during the day to try and get some extra practice*." (ID06:SeSP, Rehab, M). "*We, like, always ask if people have got iPads and try and get them to do stuff on their own*," (ID08:SeSP, Comb, Metro) "*We've got an iPAD… I use it a lot actually*." (ID13:SeSP, Rehab, Regional)
		Lack or presence of Allied Health Assistants or students to provide more intensive therapy	"*If we had an (allied health) aide it would be great. I always say, "Oh, that would be great for the aide". Now we just take lots of students*" (ID09:SeSP, Rehab, Regional) "*Tuesday to Thursday providing my AHA is here, (patients) will get seen twice daily… we usually do one each*." (ID13: SeSP, Rehab, Regional)
	Time	Lack of time to prepare therapy materials	"*Time is one (barrier)....coming up with therapy material*." (ID06:SeSP, Rehab, Metro).
		Lack of time to plan for therapy or develop AHA programs	"*So if I don't have the time to make the AHA program it won't get done*." (ID11:BaSP, Comb, Metro)
	Staffing Ratios	Staffing ratios can be a barrier	"*If there was more people on the ground, you'd get more intensity... because as soon as it gets busy, you drop your intensity*." (ID06:SeSP, Rehab, Metro)

	Competing and/or fluctuating caseload demands	Caseload demands fluctuate with patient numbers and staff leave	"*Patient numbers fluctuate so much. So there was one month there that we had, like, for a week or two, like, two patients between us. It was so quiet (…) and then now we've got like sixteen patients on our list and we're flat out (…) I* try *to get to see everybody everyday. Um, if possible. Like, caseload again might not allow that to happen…(…) or people are on annual leave, so we've got to cover the ward*" (ID06:SeSP, Rehab, Metro).
		Caseload demands may prevent intensive therapy	"*And when you have got competing demands, um...with the best of intentions, sometimes you don't get there that often*." (ID08:SeSP, Comb, Metro)
		Prioritisation - Aphasia may be seen as a high priority compared to stable dysphagia	"*Our dysphagic patients… they might then not get seen as frequently, but, like, if they're stable on a diet we'll probably prioritise an aphasia session with someone over doing a lunch review to upgrade from a soft to a full diet.."* (ID06: SeSP, Rehab, Metro)
	Caseload Structure and Timetabling	Ability to timetable therapy time facilitates access to patient for therapy	"*Time tabling is crucial*." (ID13: SeSP, Rehab, Regional). "*We timetable for the week ahead*." (ID06: SeSP, Rehab, Metro).
		Caseload demands challenging when balancing both acute and rehabilitation caseloads	"*I could never look at the start of the week and map what my week's going to be like because it's so different day-to-day*." (ID11:BaSP, Comb, Metro)
	Access to patient and family	Difficulty accessing family	"*The family's not always available, or they don't have those social supports, to come and do that (home program) with them*." (ID01:SeSP, Comb, Metro)
		Ability to access patient and relying on other disciplines to transfer patient to therapy room	"*Just things like other appointments that the patient might have. If they need an MRI they go to (…) for the day. If they have some little investigations, that can make them really fatigued*." (ID11:BaSP, Comb, Metro) "*If you try and timetable to see them at nine o'clock in the morning forget it cause they'll still be lying in bed and they haven't been hoisted out into the shower chair*." (ID06:SeSP, Rehab, Metro)
	Organisational culture	Often organisational focus is on discharge and aphasia is not given priority	"*Sometimes if their language is the only thing, they'll just send them home*…"(ID11:BaSP, Comb, Metro)
Key Domain	**Theme**	**Subtheme**	**Representative quotations**
Beliefs about Consequences	Beliefs about effectiveness	Beliefs that patients benefit from intensive therapy for aphasia	"*I think it makes a difference*." (ID06:SeSP, Rehab, Metro)

	and/or outcomes for patients		"*They need the five days a week and then I like to try and give them, or I would ideally like to give them something for the weekend to keep them stimulated*." (ID11:BaSP, Comb, Metro)
		Not convinced that more intensive therapy will always improve outcomes	"*People tend to be quite fatigued in the early stages, and they also can be quite labile as well, so I don't know that having like a high intense approach would be very beneficial in an acute stage." (*ID20:BaSP, Acute, Metro*)* *"So, sometimes, I just think at the end of the day, in my heart of hearts, I don't always believe that cramming in an extra session in the afternoon is going to affect the long term outcome."* (ID13:SeSP, Rehab, Regional) "*I certainly wouldn't do it for everyone because I don't think it's warranted for everyone*." (ID01:SeSP, Comb, Metro)
		Belief that intensive therapy is more appropriate in rehab setting	"*Sometimes you do have to take a step back, and their intense approach is sometimes better suited to a Rehab setting where, you know, it's just a completely different vibe."* (ID20:BaSP, Acute, Metro)
		Belief that too much therapy could be detrimental to patients	*"Sometimes it's counter-productive because you're tiring them out so much."* (ID13:SeSP, Rehab, Regional) "*…you have a window of recovery, with spontaneous recovery, and I just wouldn't want particularly the people who have haemorrhagic strokes, like, you wouldn't want to overwork them, or you wouldn't want an extension or something to happen."* (ID20:BaSP, Acute, Metro)
	Anticipated regret	Anticipated regret that patients won't get the necessary treatment	"*If you're not doing that (providing as much therapy as possible), then …you're shortchanging them*." (ID03:BaSP, Rehab, Metro)
		Anticipated regret that a lack of SP involvement could lead to adverse outcomes in hospital	"*So many negative consequences happen in hospitals because people can't communicate their needs properly*…" (ID07:BaSP, Comb, Metro)
		Anticipated guilt if couldn't provide therapy	"*Also when you're handing over to someone when that patient is going to rehab I would feel really embarrassed and uncomfortable to have to say there's a lot to do there and I didn't even start, I haven't done anything yet*…" (ID18:SeSP, Acute, Metro)
Key Domain	**Theme**	**Subtheme**	**Representative quotations**
Social Influences	Patient and family	Some patients expect to receive a lot of therapy	"*I think that, many of them do (expect it)."* (ID03:BaSP, Rehab, Metro)

	expectations and priorities		"*If clients don't get to see you that day, they're like,* "So why aren't I seeing you?"" (ID09:SeSP, Rehab, Regional)
		Intensive therapy is not always a priority for patients, and this will influence how much therapy the SP provides	"*I guess it's just how it fits in terms of their overall goal, so if they want to focus on physio, and they're fatiguing because they're in speech every second day, then that's not ideal for them."* (ID03:BaSP, Rehab, Metro). "*I've got a patient at the moment who's just not really motivated for therapy*." (ID06:SeSP, Rehab, Metro) "*They just really want to be with their families, so I think that sometimes there's lots of other things going on as well, and so I think the priority is, well: Is that really something that's appropriate at this stage?"* (ID 20:BaSP, Acute, Metro)
		Families may expect direct therapy from the SP and may not support home programs	"*And I've had some families, like, say, "No, I'm not doing this with the family member, that's your role"...."* (ID09:SeSP, Rehab, Regional)
	Staff and/or colleague expectations	Colleagues more supportive of SP providing therapy if they have seen intensive therapy to be effective	"*We've had some quite good success stories for some this year. So I think our consultant is very receptive to be like, "All right, all right, you can have them for four weeks." Rather than typically, like, for two weeks*." (ID06:SeSP, Rehab, Metro)
		Colleagues expect SP to provide intensive therapy	"*They'll (MDT) expect that we'll see them every day*", (ID06:SeSP, Rehab, Metro) "*If I DON'T get to see someone, they might be saying, "Oh, is everything... are you going to get to see blah blah today*?" (ID09:SeSP, Rehab, Metro)
		Colleagues supportive of SP decision-making re intensity of therapy	"*Often if we're not seeing them every day it'll be for a reason and the team will very much understand. Yeah, so, no, I don't feel pressure*." (ID06:SeSP, Rehab, Metro) *"I mean there is an expectation that those that need it will have at least daily therapy. But then they do leave it to my clinical judgement*." (ID13:SeSP, Rehab, Regional)
		Colleagues can pressure SLPs to provide more intensive therapy	"*I feel like there's this overarching pressure, and a lot of it might be SELF-pressure, like, me going "oh I'm not going to get to see blah" you know? And, like, I worry about that. Like, and I...so before we had... so in this position, it was, used to just be me... um, and then they... so I was ALWAYS, like, short staffed ... ALWAYS, like, running around, like crazily*." (ID09:SeSP, Rehab, Regional)

			"*I feel like there's a lot of pressure (from the MDT) of "Well why haven't you fixed them yet?" or "Why aren't they getting better?"* (ID11:BaSP, Comb, Metro)
	Leadership	SP seniors support and encourage base-grade clinicians	"*Support from my supervisor helps…She's able to give me some really good ideas*." (ID11:BaSP, Comb, Metro)
Key Domain	**Theme**	**Subtheme**	**Representative quotations**
Social/Professional Role and Identity	Role to advocate	It is the role of the SLP to advocate for more intensive service delivery	"*We've kind of, really been pushing for them to come here and pushing for them to stay for four weeks."* (ID06:SeSP, Rehab, Metro) "*…they NEED speech pathology, like I say, "Why can't we go and see them every day?"* (ID08:SeSP, Comb, Metro)
	Role to provide intensive therapy	Belief it is the role of the SLP to provide intensive therapy for aphasia	"*It's our core business*." (ID09:SeSP, Rehab, Metro)
Key Domain	**Theme**	**Subtheme**	**Representative quotations**
Knowledge	Theoretical knowledge	Familiarity with underlying evidence	"*One of the language special interest groups (…) presented their work on the study they did looking at intensity, the different models that they had to achieve intensity. But you know, so it's just been whatever I've kinda picked up through special interest groups, and particularly journal articles that people bring out, discussions*." (ID06:SeSP, Rehab, Metro) "*What I've read in the literature is that it benefits their outcomes in terms of making gains*." (ID11:BaSP, Comb, Metro) "*I just have to be guided by the evidence really which suggests the more intense the better*." ." (ID13:SeSP, Rehab, Regional) "*I think in terms of what we're meant to be doing according to the literature, I find it really confusing, because...it's difficult to keep abreast of all the latest updates, um, and there seems to be conflicting evidence…*" (ID01:SeSP, Comb, Metro)
	Knowledge of the task environment	Lack or presence of knowledge of what resources are available and where to find them	"*We do have the iPads, I haven't had a play with the iPads, um...I.. don't even know what's loaded onto the iPad. And I know that sounds terrible, but I actually don't even know where the iPads' stored right now, like it's just been a bit of a confusing process..."* (ID01:SeSP, Comb, Metro)
Key Domain	**Theme**	**Subtheme**	**Representative quotations**

Goals	Goals	Goal of SP department is to provide more intensive therapy	"*The department have been really open to trying to change their practice in terms of communication and they've implemented a lot of like, um...changes around that you...early on you refer if they need rehab, and you put communication recommendations in*." (ID08:SeSP, Comb, Metro)
	Action Planning	Awareness it is an area for improvement	"*But I've got a lot of plans around structuring (therapy). I really want to come up with goals (for that)*." (ID11:BaSP, Comb, Metro)

Table S5: Factors that influence speech pathologists' routine provision of ***providing conversation partner training***

BaSP = base-grade speech pathologist, SeSP = senior speech pathologist, MaSP = speech pathology manager;
Acute = Acute setting, Comb = Combination of acute and rehabilitation settings, Rehab = rehabilitation setting;
Metro = Metropolitan/RA1* (Major City), Regional = RA2* (Inner Regional) * Australian Standard Geographical Classification – Remoteness Areas

Key Domain	Theme	Subtheme	Representative quotations
Environment context and resources	Resources	Lack or presence of appropriate resources available for CPT	"*I suppose I mostly refer to some of the general strategies on our aphasia handouts*." (ID06:SeSP, Rehab, Metro) "*If it's more informal we do have sort of aphasia-friendly handouts. Um, for patients and families, just outlining some general tips*." (ID07:BaSP, Comb, Metro) "*I made a program for healthcare workers in terms of communication training for nurses and doctors, (…) and I've kept it and adapted it for a family brochure as well*." (ID15:SeSP, Rehab, Metro)
	Time	Providing formal CPT program is time consuming	"*It's a full program. It's not just something that I could like pick up and give some education to a family member in half an hour. You kind of go through… I think you almost have weekly sessions, training sessions. And so it's like setting up a whole group which just isn't gonna happen*." (ID06:SeSP, Rehab, Metro) "*The idea of it (formal CPT program) was great, it sounds really good and it's a lovely idea but it's not feasible on an acute ward and that's the thing. If you're doing it I'm just wasting my time really*." (ID18:SeSP, Acute, Metro). "*I don't find that I ever have enough time to actually show them the videos*." (ID15:SeSP, Rehab, Metro)
	Access to family	Difficulty accessing family to provide CPT	"*I suppose one big barrier is trying to get the family in all at once*." (ID07:BaSP, Comb, Metro)

			"*I suppose it's something that I'm doing, not all the time. Um, 'cause it also depends on capturing the family*." (ID06:SeSP, Rehab, Metro)
	Logistics of organising staff training	Difficulty in training staff due to staff responsibilities, time, and location	"*I would have to do it on so many different wards because we don't have somewhere that all the strokes go, so that's a huge barrier*." (ID18:SeSP, Acute, Metro).
Key Domain	**Theme**	**Subtheme**	**Representative quotations**
Beliefs about Consequences	Beliefs about effectiveness and/or outcomes for patients and their families	Beliefs that some patients benefit from CPT more than others (e.g., if younger, or have reduced access to therapy post discharge)	"*I've got a patient now that we are as a team trying to do carer training, but I think that's been driven much more from the fact that he's a young man going to a nursing home who's then not going to have access to really much therapy*." (ID06:SeSP, Rehab, Metro) "*I've done that with probably the more severe aphasic people, who the individual therapy... you know, they're not able to implement strategies themselves, so they need someone else to help them out*." (ID07:BaSP, Comb, Metro)
		Beliefs that outcomes of CPT depend on how much the carer understands the CPT approach, and can sometimes have a negative outcome	"*If the carer is very receptive and switched on and gets it, yes, I think the outcomes can be fantastic*." (ID06:SeSP, Rehab, Metro) "*Even after doing the communication training, I've had a LOT of family members that just aren't able to use the recommendations, and you can see that they're trying but they're actually just making it worse*." (ID07:BaSP, Comb, Metro)
		Beliefs that families may be offended if provided feedback on their communication	"*I've never actually used the technique of, you know, videotaping them and playing it back because I think it can be really confronting for some people*." (ID07:BaSP, Comb, Metro)
		Not convinced that CPT is worthwhile in acute as patient can change rapidly	"*I struggle to justify spending a lot of time training someone when obviously we hope that person is not going to need the same supports in even two days' time, we'd like to hope that they've made some gains by then and it's going to change*…" (ID18:SeSP, Acute, Metro)
		Belief that effective CPT can reduce stress and isolation for communication partners and PWA	"*I think it takes away that stress on the person with aphasia on having to have the right answers or having to have the words all the time. Also for that communication partner in knowing and having the confidence to resolve those breakdowns and do it sensitively without the whole situation escalating*." (ID15:SeSP, Rehab, Metro)
	Anticipated regret	Anticipated regret that outcomes will be poorer if CPT not provided	"*If I'm unable to provide it's a missed opportunity and you're not um, you know you're missing an opportunity to maximise, you know, the communicative success*." (ID06:SeSP, Rehab, Metro)

			"*If they can't talk to their family then they're going to be pretty isolated. Um... so I think it is a REALLY important part of therapy*." (ID07:BaSP, Comb, Metro)
Key Domain	**Theme**	**Subtheme**	**Representative quotations**
Social Influences	Patient and family expectations and priorities	Family willingness to receive training from SLP	"*For some of the families it's fantastic because if they are quite present on the wards they might have been sitting in on some of the sessions anyway*." (ID06:SeSP, Rehab, Metro)
		If families request information the SLP is more likely to provide it	"*Certainly the patient's visitors or family will ask questions like what can we do to help her. And that certainly is a huge prompt for me spending more time educating that person than I might someone that didn't ask."* (ID18:SeSP, Acute, Metro)
		Patients and families may have other priorities in acute phase, and this will influence whether the SP provides CPT	"*In that initial stage that may not be the number one concern, they're maybe happy enough that they're getting by kind of having a bit of conversation, that they're more concerned about the acute medical aspects of things*." (ID18:SeSP, Acute, Metro).
		Families may expect direct therapy from the SP and may not support CPT	"*I don't think that's something that they really expect or understand that we will do. They expect you more to work with the patient and fix them. You know, how are you going to make this person better?"* (ID07:BaSP, Comb, Metro) "*I find sometimes when I'm trying to give some strategies and ideas and things to the patient's family you almost feel like they're saying keep working with her what are you doing, why aren't you with here, why are you telling me all this. So that might be a little bit of a barrier too, that's not what people are wanting or expecting from you at that stage*. " (ID18:SeSP, Acute, Metro) "*Sometimes the family don't see it as therapy (…) they don't feel it to be maybe as beneficial as some of the other impairment based things that we might be doing."* (ID15:SeSP, Rehab, Metro)
	Staff and/or colleague expectations	Some staff not supportive of SLP role in providing training	"*I don't know how many times I turned up for this inservice and they'd choose to book them in at handover times and try to get the morning and the afternoon staff none of which wanted to be there. All of them were trying to do their handover to each other while you're speaking, still writing notes, it was incredibly rude and a horrible feeling."* (ID18:SeSP, Acute, Metro)
		Some colleagues do not expect or request CPT from SLP	"*Not so much from the nursing staff or other Allied Health staff, I don't generally find that they're asking what would help, how can we communicate better with this person*?" (ID18:SeSP, Acute, Metro)
		Some nursing staff have requested CPT by SLP	"*We do have a CNC, a rehab CNC here. Um, she just caught me in the corridor today and was asking me about…um, sort of what strategies for nurses for people with aphasia and communication difficulties, so…."* (ID06:SeSP, Rehab, Metro)

	Leadership	Other SLP colleagues expect it to be provided if necessary	"*The level 1/2 (SLP) that I have is fantastic, and a really strong advocate and is very passionate about conversation partner training*." (ID06:SeSP, Rehab, Metro)
Key Domain	**Theme**	**Subtheme**	**Representative quotations**
Knowledge	Theoretical knowledge	Knowledge about theory behind CPT approach	"*I did one of my research projects on CPT*." (ID15:SeSP, Rehab, Metro)
	Knowledge of the task environment	Lack or presence of knowledge of what resources are available and how to access them	"*There's a PowerPoint that you can access if you just Google supported conversation people with aphasia Kagan, (…) So there's about eight slides that I've actually printed out and sometimes refer to those points and concepts with families*." (ID06:SeSP, Rehab, Metro)
	Procedural knowledge	Limited procedural knowledge and familiarity with running formal CPT programs	"*We've got the SPARCC here, but we don't run it as a program…Not really familiar (with it*)." (ID 06:SeSP, Rehab, Metro)

Appendix D-1. Chapter 7, Ethics Approvals

Metro South Health

Enquiries to: Metro South
Human Research Ethics Committee
Phone: 07 3443 8049
Fax: 07 3443 8003
HREC Ref: HREC/16/QPAH/52
E-mail: Ethicsresearch.pah@health.qld.gov.au

Ms Kirstine Shrubsole
Research Higher Degree Student
Division of Speech Pathology
School of Health & Rehabilitation Sciences
University of Queensland
St Lucia Qld 4072

Dear Ms Shrubsole

HREC Reference number: HREC/16/QPAH/52
Project Title: Improving speech pathologists' implementation of recommended practices in acute aphasia management: A pilot cluster randomised control trial.

Thank you for submitting the above research protocol to the Metro South Human Research Ethics Committee for ethical and scientific review. This protocol was first considered by the Human Research Ethics Committee (HREC) at the meeting held on 2 February 2016.

You are reminded that this letter constitutes ethical approval only. You must not commence this research protocol at a site until separate authorisation from the Metro South Chief Executive or Delegate of that site has been obtained.

A copy of this approval must be submitted to the Research Governance Office(r)/Delegate of the relevant institution with a completed Site Specific Assessment (SSA) Form for authorisation from the Chief Executive or Delegate to conduct this research at the sites listed in the appendix below.

If this study currently receives grant funding, please remember to forward a copy of this approval letter to the relevant Grants Office of the Administering Institution(s) for the grant.

I am pleased to advise that the HREC has granted approval of this research protocol. The documents reviewed and approved include:

Document	Version	Date
NEAF		13 January 2016
Master Participant Information/Consent form – Speech Pathologist	2	5 April 2016
Recruitment Expression of Interest form – Speech Pathologists	1	12 January 2016
Letter in response to HREC comments		21 April 2016
Master File Audit form	1	20 April 2016
Master Case Encounter form	1	5 April 2016
Master Survey – Speech Pathologist	1	20 April 2016
Master Research Protocol	1	20 April 2016

This HREC approval is valid from 28 April 2016 until 28 April 2019.

Please note the following conditions of approval:

1. The researcher must provide an annual report to the HREC and a final report on completion of the study, in the specified format. Approval is contingent upon submission of this.
2. The Principal Investigator will immediately report anything which might warrant review of ethical approval of the protocol in the specified format, including unforeseen events that might affect continued ethical acceptability of the protocol. Serious Adverse Events must be notified to the HREC as soon as possible. In addition the Investigator must provide a summary of the adverse events, in the specified format, including a comment as to suspected causality and whether changes are required to the Patient Information and Consent Form. In the case of Serious Adverse Events occurring at the local site, a full report is required from the Principal Investigator, including duration of treatment and outcome of the event.
3. Amendments to the research protocol which may affect the ongoing ethical acceptability of a protocol must be submitted to the HREC for review. Amendments should accompanied by all relevant updated documentation and a cover letter from the principal investigator, providing a brief description of the changes, the rationale for the changes, and their implications for the ongoing conduct of the study. Hard copies of the cover letter and all relevant updated documents, with *tracked changes*, must also be submitted to the HREC office as per standard HREC SOP.
4. Amendments to the research protocol which only affect the ongoing site acceptability of the protocol are not required to be submitted to the HREC for review. These amendment requests should be submitted directly to the Research Governance Office/r.
5. Proposed amendments to the research protocol which may affect both the ethical acceptability and site suitability of the protocol must be submitted firstly to the HREC for review and, once HREC approval has been granted, then submitted to the Research Governance Office/r.
6. Amendments which do not affect either the ethical acceptability or site acceptability of the protocol (e.g. typographical errors) should be submitted electronically (track changes) and in hard copy (final clean copy) to the HREC Coordinator. These should include a cover letter from the Principal Investigator providing a brief description of the changes and the rationale for the changes, and accompanied by all relevant updated documents with tracked changes.
7. The HREC will be notified, giving reasons, if the protocol is discontinued at a site before the expected date of completion.
8. The Principal Investigator will provide at least, an annual report to the HREC on the anniversary of the approval and at completion of the study in the specified format.
9. If you require an extension for your study, please submit a request for an extension in writing outlining the reasons. Note: One of the criteria for granting an extension is the compliance with the approval's conditions including submission of progress reports.
10. Any research study that prospectively assigns human participants or groups of humans to one or more health-related interventions to evaluate the effects on health outcomes (WHO / ICMJE 2008 definition) should be registered, including early phase and late phase clinical trials (phases I-III) in patients or healthy volunteers (WHO Recommendation / ICMJE policy). If in doubt, registration is recommended. All studies must be registered prior to the study's inception, i.e. prospectively. http://www.anzctr.org.au/

Should you have any queries about the HREC's consideration of your protocol please contact the Metro South HREC Office on 07 3443 8049.

Please note that the Metro South HREC is constituted and operates in accordance with the National Health and Medical Research Council's (NHMRC) *National Statement on Ethical Conduct in Human Research (2007), NHMRC and Universities Australia Australian Code for the Responsible Conduct of Research (2007)* and the *CPMP/ICH Note for Guidance on Good Clinical Practice*. Attached is the HREC Composition (Attachment I).

Once authorisation to conduct the research has been granted, please complete the Commencement Form (Attached) and return to the Metro South Human Research Ethics Committee.

The Metro South HREC wishes you every success in your research.

Yours sincerely,

A/Prof Richard Roylance
Chair
Metro South Hospital and Health Service
Human Research Ethics Committee (EC00167)
Centres for Health Research
Princess Alexandra Hospital

28/4/2016

THE UNIVERSITY OF QUEENSLAND

Institutional Human Research Ethics Approval

Project Title:	Improving Speech Pathologists' Implementation of Recommended Practices in Acute Aphasia Management: A Pilot Cluster Randomised Trial
Chief Investigator:	Ms Kirstine Shrubsole
Supervisor:	Prof Linda Worrall, Dr Emma Power, Dr Denise O'Connor
Co-Investigator(s):	Prof Linda Worrall, Dr Emma Power, Dr Denise O'Connor
School(s):	School of Health and Rehabilitation Sciences (UQ), Faculty of Health Sciences (University of Sydney), School of Public Health and Preventive Medicine (Monash University)
Approval Number:	2016000782
Granting Agency/Degree:	PhD
Duration:	1st March 2017

Comments/Conditions:

Expedited review on the basis of approval by Metro South Health HREC, dated 28/04/2016 (HREC/16/QPAH/52)

Master Participant Information/Consent form - Speech Pathologist v2, 5 April 2016
Recruitment Expression of Interest form - Speech Pathologists v1, 12 January 2016
Master File Audit form v1, 20 April 2016
Master Case Encounter form v1, 5 April 2016
Master Survey - Speech Pathologist v1, 20 April 2016
Master Research Protocol v1, 20 April 2016

Note: if this approval is for amendments to an already approved protocol for which a UQ Clinical Trials Protection/Insurance Form was originally submitted, then the researchers must directly notify the UQ Insurance Office of any changes to that Form and Participant Information Sheets & Consent Forms as a result of the amendments, before action.

Name of responsible Committee:
Medical Research Ethics Committee
This project complies with the provisions contained in the *National Statement on Ethical Conduct in Human Research* and complies with the regulations governing experimentation on humans.

Name of Ethics Committee representative:
Dr Jennifer Paratz
Chairperson
Medical Research Ethics Committee

Signature _____ Date 24/5/16

Appendix D-2. Chapter 7, TIDieR Checklist

TIDieR Template for Intervention Description and Replication

The TIDieR (Template for Intervention Description and Replication) Checklist*:

Information to include when describing an intervention and the location of the information

Item number	Item	Where located **	
		Primary paper (page or appendix number)	Other † (details)
	BRIEF NAME		
1.	Provide the name or a phrase that describes the intervention.	193_____	tailored, theory-inform behaviour change intervention
	WHY		
2.	Describe any rationale, theory, or goal of the elements essential to the intervention.	191-193____	Barrier/TDF/BCW
	WHAT		
3.	Materials: Describe any physical or informational materials used in the intervention, including those provided to participants or used in intervention delivery or in training of intervention providers. Provide information on where the materials can be accessed (e.g. online appendix, URL).	198-199, Table 7-2_____	Educational and interactive workshop, powerpoint, resources (e.g., PDF)
4.	Procedures: Describe each of the procedures, activities, and/or processes used in the intervention, including any enabling or support activities.	198-199_____	Role play, problem solving,

			brainstorming, videos of PWA
	WHO PROVIDED		
5.	For each category of intervention provider (e.g. psychologist, nursing assistant), describe their expertise, background and any specific training given.	199_____	Speech pathologist/ researcher x 2
	HOW		
6.	Describe the modes of delivery (e.g. face-to-face or by some other mechanism, such as internet or telephone) of the intervention and whether it was provided individually or in a group.	199_____	Face-to-face, group
	WHERE		
7.	Describe the type(s) of location(s) where the intervention occurred, including any necessary infrastructure or relevant features.	211_____	Conference room, at hospitals
	WHEN and HOW MUCH		
8.	Describe the number of times the intervention was delivered and over what period of time including the number of sessions, their schedule, and their duration, intensity or dose.	199_____	Single face-to-face workshop, 2.5 hours
	TAILORING		
9.	If the intervention was planned to be personalised, titrated or adapted, then describe what, why, when, and how.	211_____	Barriers identified prior and during, teams developed own strategies
	MODIFICATIONS		
10.‡	If the intervention was modified during the course of the study, describe the changes (what, why, when, and how).	211_____	Less time for modelling than planned due to more

			interactive discussion
	HOW WELL		
11.	Planned: If intervention adherence or fidelity was assessed, describe how and by whom, and if any strategies were used to maintain or improve fidelity, describe them.	206	Fidelity checklist
12.‡	Actual: If intervention adherence or fidelity was assessed, describe the extent to which the intervention was delivered as planned.	211_____	Less time for modelling than planned due to more interactive discussion

** **Authors -** use N/A if an item is not applicable for the intervention being described. **Reviewers** – use '?' if information about the element is not reported/not sufficiently reported.

† If the information is not provided in the primary paper, give details of where this information is available. This may include locations such as a published protocol or other published papers (provide citation details) or a website (provide the URL).

‡ If completing the TIDieR checklist for a protocol, these items are not relevant to the protocol and cannot be described until the study is complete.

* We strongly recommend using this checklist in conjunction with the TIDieR guide (see *BMJ* 2014;348:g1687) which contains an explanation and elaboration for each item.

* The focus of TIDieR is on reporting details of the intervention elements (and where relevant, comparison elements) of a study. Other elements and methodological features of studies are covered by other reporting statements and checklists and have not been duplicated as part of the TIDieR checklist. When a randomised trial is being reported, the TIDieR checklist should be used in conjunction with the CONSORT statement (see www.consort-statement.org) as an extension of Item 5 of the CONSORT 2010 Statement. When a clinical trial protocol is being reported, the TIDieR checklist should be used in conjunction with the SPIRIT statement as an extension of Item 11 of the SPIRIT 2013 Statement (see www.spirit-statement.org). For alternate study designs, TIDieR can be used in conjunction with the appropriate checklist for that study design

Appendix D-3. Chapter 7, STaRI Checklist

Standards for Reporting Implementation Studies: the StaRI checklist for completion

The StaRI standard should be referenced as: Pinnock H, Barwick M, Carpenter C, Eldridge S, Grandes G, Griffiths CJ, Rycroft-Malone J, Meissner P, Murray E, Patel A, Sheikh A, Taylor SJC for the StaRI Group. Standards for Reporting Implementation Studies (StaRI) statement. *BMJ* 2017;356:i6795

The detailed Explanation and Elaboration document, which provides the rationale and exemplar text for all these items is: Pinnock H, Barwick M, Carpenter C, Eldridge S, Grandes G, Griffiths C, Rycroft-Malone J, Meissner P, Murray E, Patel A, Sheikh A, Taylor S, for the StaRI group. Standards for Reporting Implementation Studies (StaRI). Explanation and Elaboration document. *BMJ Open* 2017 2017;7:e013318

Notes: A key concept of the StaRI standards is the dual strands of describing, on the one hand, the implementation strategy and, on the other, the clinical, healthcare, or public health intervention that is being implemented. These strands are represented as two columns in the checklist.

The primary focus of implementation science is the implementation strategy (column 1) and the expectation is that this will always be completed.	The evidence about the impact of the intervention on the targeted population should always be considered (column 2) and either health outcomes reported or robust evidence cited to support a known beneficial effect of the intervention on the health of individuals or populations.

The StaRI standards refers to the broad range of study designs employed in implementation science. Authors should refer to other reporting standards for advice on reporting specific methodological features. Conversely, whilst all items are worthy of consideration, not all items will be applicable to, or feasible within every study.

Checklist item	Reported on page #	Implementation Strategy	Reported on page #	Intervention
		"Implementation strategy" refers to how the intervention was implemented		"Intervention" refers to the healthcare or public health intervention that is being implemented.
Title and abstract				

Title	**1**	AAIMs	Identification as an implementation study, and description of the methodology in the title and/or keywords		
Abstract	**2**	Theory informed behaviour change intervention	Identification as an implementation study, including a description of the implementation strategy to be tested, the evidence-based intervention being implemented, and defining the key implementation and health outcomes.		
Introduction					
Introduction	**3**	Evidence practice gap in Aphasia	Description of the problem, challenge or deficiency in healthcare or public health that the intervention being implemented aims to address.		
Rationale	**4**	TDF/BCW	The scientific background and rationale for the implementation strategy (including any underpinning theory/framework/model, how it is expected to achieve its effects and any pilot work).	TDF/BCW/ BCT	The scientific background and rationale for the intervention being implemented (including evidence about its effectiveness and how it is expected to achieve its effects).
Aims and objectives	**5**	To improve target behaviours	The aims of the study, differentiating between implementation objectives and any intervention objectives.		
Methods: description					
Design	**6**	BCTs and intervention functions	The design and key features of the evaluation, (cross referencing to any appropriate methodology reporting standards) and any changes to study protocol, with reasons		
Context	**7**	4 Australian Acute SP teams	The context in which the intervention was implemented. (Consider social, economic, policy, healthcare, organisational barriers and facilitators that might influence implementation elsewhere).		

		– known barriers			
Targeted 'sites'	**8**	SPs in an acute hospital seeing pts with aphasia, known practice gap	The characteristics of the targeted 'site(s)' (e.g locations/personnel/resources etc.) for implementation and any eligibility criteria.	Acute patients with aphasia due to CVA	The population targeted by the intervention and any eligibility criteria.
Description	**9**	1 x 2.5 hr workshop tailored to barriers	A description of the implementation strategy	Provision of aphasia friendly information or collaborative goal setting	A description of the intervention
Sub-groups	**10**	2 interventions – blinded, randomised	Any sub-groups recruited for additional research tasks, and/or nested studies are described		
Methods: evaluation					
Outcomes	**11**	File audits, surveys, focus groups, fidelity checklist	Defined pre-specified primary and other outcome(s) of the implementation strategy, and how they were assessed. Document any pre-determined targets	n/a	Defined pre-specified primary and other outcome(s) of the intervention (if assessed), and how they were assessed. Document any pre-determined targets
Process evaluation	**12**	Focus groups, fidelity checklist,	Process evaluation objectives and outcomes related to the mechanism by which the strategy is expected to work		

		results of survey used to show whether barriers addressed			
Economic evaluation	**13**	n/a	Methods for resource use, costs, economic outcomes and analysis for the implementation strategy	n/a	Methods for resource use, costs, economic outcomes and analysis for the intervention
Sample size	**14**	Pilot study	Rationale for sample sizes (including sample size calculations, budgetary constraints, practical considerations, data saturation, as appropriate)		
Analysis	**15**	Change measures between pre and post measures for file audits and survey	Methods of analysis (with reasons for that choice)		
Sub-group analyses	**16**	Comparison of results (between group analyses)	Any a priori sub-group analyses (e.g. between different sites in a multicentre study, different clinical or demographic populations), and sub-groups recruited to specific nested research tasks		

Results					
Characteristics	**17**	37 SPs, Table 7-5	Proportion recruited and characteristics of the recipient population for the implementation strategy	107 patients (audits)	Proportion recruited and characteristics (if appropriate) of the recipient population for the intervention
Outcomes	**18**	Sig improvement for Ix A, no change for Ix B	Primary and other outcome(s) of the implementation strategy	n/a	Primary and other outcome(s) of the Intervention (if assessed)
Process outcomes	**19**	Feasible, acceptable, areas for improvement	Process data related to the implementation strategy mapped to the mechanism by which the strategy is expected to work		
Economic evaluation	**20**	n/a	Resource use, costs, economic outcomes and analysis for the implementation strategy	n/a	Resource use, costs, economic outcomes and analysis for the intervention
Sub-group analyses	**21**	More barriers and less change for Ix B	Representativeness and outcomes of subgroups including those recruited to specific research tasks		
Fidelity/ adaptation	**22**	Core concepts adhered to, adaptations recorded	Fidelity to implementation strategy as planned and adaptation to suit context and preferences	n/a	Fidelity to delivering the core components of intervention (where measured)
Contextual changes	**23**	Results of focus groups –	Contextual changes (if any) which may have affected outcomes		

		organisational factors e.g., medical records and group facilitator			
Harms	**24**	n/a	All important harms or unintended effects in each group		
Discussion					
Structured discussion	**25**	Mechanisms of change, level of buy-in, sustainability, complexity of behaviours	Summary of findings, strengths and limitations, comparisons with other studies, conclusions and implications		
Implications	**26**	Feasible, acceptable, potentially effective → mods needed for scaleup	Discussion of policy, practice and/or research implications of the implementation strategy (specifically including scalability)	Further investigation into sustainability needed	Discussion of policy, practice and/or research implications of the intervention (specifically including sustainability)
General					
Statements	**27**	Ethics obtained	Include statement(s) on regulatory approvals (including, as appropriate, ethical approval, confidential use of routine data, governance approval), trial/study registration (availability of protocol), funding and conflicts of interest		

Appendix D-4. Chapter 7, APEASE criteria applied to intervention functions, example

Target Behaviour: Collaborative Goal Setting

Recommended Practice 1: Health professionals should collaboratively set goals for patient care. Goals should be prescribed, specific and challenging. They should be recorded, reviewed and updated regularly. The stroke team should meet regularly with the patient and their family/carer to involve them in management, goal setting and planning for discharge.

Topic	Who provides	What	To whom	When	How
Goal setting	Speech therapists	Should set goals for patient care			collaboratively
		Should set goals that are prescribed, specific and challenging.			
		Should record and review goals		And update them regularly	
	The stroke team	Should have a meeting regarding management, goal setting and planning for discharge	With the patient and their family/carer	regularly	

Mapping Barriers to Possible Intervention Strategies

COM-B	**Barrier**	TDF	Intervention Functions	Does the intervention function meet the APEASE criteria? (affordability, practicability, effectiveness/cost, acceptability, side-effects, safety, equity)
Reflective motivation	Beliefs about capabilities	Perceived behavioural control, lack of confidence – find it difficult when pt not engaged in process, 'too hard' with someone with severe aphasia or receptive difficulties. Have own SP goals but don't involve patient – "have own goals in my head'	Education Persuasion Modelling Enablement	Yes Yes Yes Yes, behavioural support
Social opportunity	Social Influences	Concerns that it may be overwhelming to patient – pts can be distressed so it won't be useful. Beliefs that patients aren't ready/can't participate at this stage	Environmental restructuring Enablement Restriction Modelling	Yes, some aspects (resources) Not practicable to restructure priority system of department or increase staff etc Yes, behavioural support Not practicable as there are no options to restrict in this context

				Yes, possible (role-play, video etc)
Physical Opportunity	Environmental context and Resources	Lack of appropriate resources for acute setting (for MTD goal setting) e.g., too much information, not specific. Lack of access to family – if families don't live locally or are working Lack of time/competing demands - dysphagia/ED more important Staffing – staff not being aware, rotating staff, difficult to implement things.	Environmental restructuring Enablement Restriction Training	Yes, some aspects (resources) Not practicable to restructure priority system of department or increase staff etc Yes, behavioural support Not practicable as there are no options to restrict in this context Yes
Reflective Motivation	Beliefs about consequences	It's not useful as pts don't understand/can't participate yet	Education Persuasion Modelling	Yes Yes Yes

Selection of Functions

Education

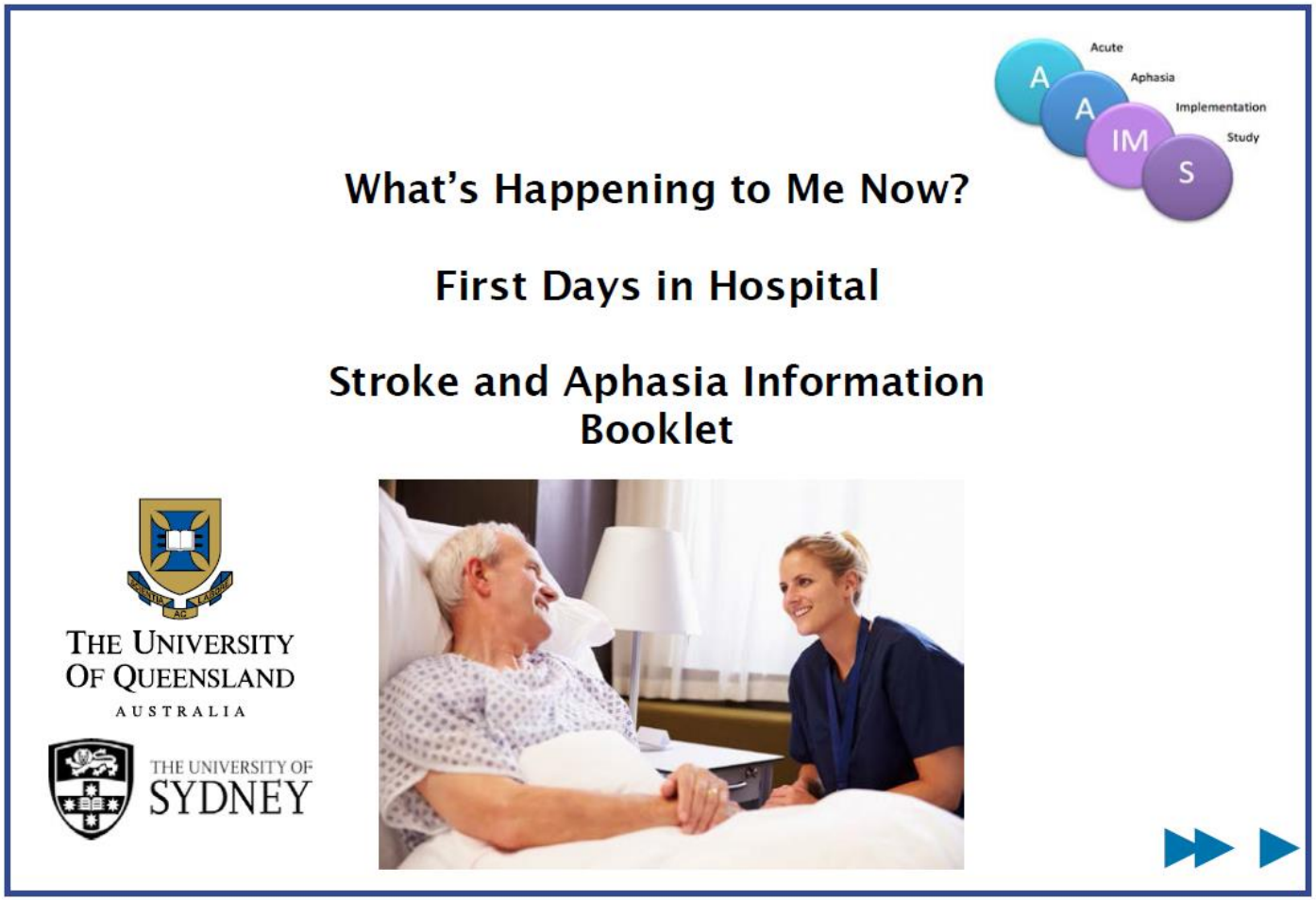
Persuasion

Modelling

Enablement

Environmental restructuring/enablement

Appendix D-5. Chapter 7, Interactive PDF - *What's happening to me now?*



Contents

How to Use this Booklet

These **symbols** are used throughout the booklet.

Sounds	Video links	Websites	Books
			

The audio or **sounds** will play **automatically**.

Press the buttons to **move** through the booklet.

Back one page	Back to contents	Forward to final page	Forward one page
			

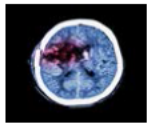

What is Aphasia? (a-FAY-zha)

Aphasia is a **communication difficulty.**

Aphasia can occur as a result of a **stroke.**

A stroke can **damage** the parts of the brain that control **talking** and **understanding** speech.

Stroke can cause Aphasia



Aphasia can affect **any mode of communication,** such as:

- **Talking** - it can be hard to say the **right word** or say little words in sentences

Talking

- **Understanding** other people - it can be hard to understand **spoken words** or converations

Understanding Others

Aphasia can also affect:

Writing

Reading

Numbers

Gesture

What exactly is Aphasia? The Treasure Hunt

Facts about Aphasia

Aphasia is **common** after **stroke**.

Up to a **third of people** who have a stroke have some type of aphasia.

Aphasia is sometimes called **dysphasia** or **anomia**.

Aphasia can affect **different people in different ways**.

Aphasia can **range** from **mild** to **severe difficulties** communicating.

Most people with aphasia **improve** but **may not fully recover**.

Aphasia is Different for Different People

About Aphasia (AAA)

What does it mean to have Aphasia?

Aphasia is **VARIABLE.**

It affects everyone **differently.**

You may still be able to **think clearly.**

But aphasia means you have **trouble getting messages in** and **out.**

Aphasia can make it **hard** to **find the words** that you want to say.

This may make you feel **frustrated.**

It can also be **hard for your family and friends** to communicate with you.

You can think clearly with aphasia

Aphasia can be frustrating

Aphasia can be hard for families

What is the Speech Pathologist's role?

Your **speech pathologist** will **help** you with your aphasia.

You may have an **assessment** to work out what things to target in therapy.

You may start **speech therapy** to work on **improving** your **communication**.

Therapy **takes time** and progress can be slow.

Your speech therapist will **work with you** to get the **maximum recovery**.

Speech Therapy can help

Progress may be fast or slow

Will I get therapy for my aphasia?

You may start **speech therapy** to work on **improving** your **communication**.

Therapy can be **tailored** to **meet your goals**.

You may have therapy in **hospial**, in a **rehabilitation unit** or **at home**.

Discuss your **options** with your **doctor** and your **speech pathologist**.

Talk to your doctor about therapy

What can I do now?

Try to **talk as much** as you are able.

Don't avoid talking.

You need to **practice talking** to get better.

Tell people to **slow down** or give you **time.**

Use your hands to gesture.

Seek **support.**

If you are feeling **tired or frustrated**, have a **rest.**

Try **not** to get **too frustrated.**

Have a break and **come back** to it later.

Try to talk as much as you can

Take your time

Rest when you are tired

Support and Adapting to Life with Aphasia

Speech therapy can help, but **aphasia may last a long time.**

You may need **support** to **adapt to life** with aphasia.

Ways to access support include:

- **Support groups** – there are often local stroke support groups and aphasia groups where you can meet other people with aphasia
- **Therapy groups** – some therapy services run communication therapy groups
- **You** can access **counselling** and support services through your hopsital

Therapy Groups Can Help

Living Well with Aphasia | Enable Me | The Australian Aphasia Association

Tips for Communicating in Hospital

- **Minimise noise**

  Make sure hearing aids are in place

  Draw bedside curtains

  Turn off the TV and radio

- **Face** the person with aphasia as you speak.

Face each other when talking

- **Make sure** only **one person is speaking** at a time.
- **Include the person with aphasia.** They may enjoy listening even if they cannot add to the conversation. If they **can** add to the conversation, the talkers should stop to listen carefully.
- **Check that** the person with aphasia has understood you
- **Let the person with aphasia know** when you **change topic**

How to visit with someone with aphasia

Important things to remember when talking to someone with aphasia

- **People with aphasia** want to feel **respected**
- **People with aphasia** want to be **included** in **decision-making**

- **Give** the person with aphasia **time to respond.**
- **Do not interrupt** or guess too quickly.

- **Do not pretend** you have understood what the person with aphasia has said if you really have not.
- **Speak slowly and clearly** but **do not shout.**

Include the person with aphasia

Allow time to respond

Strategies for Communication

It may help if you:

- **Simplify** your speech. Use simple sentences.

  Give information in s**hort 'bursts'.** This helps make it easier to understand.

- **Use gestures** and **facial expressions**.

  This can help get your message across.

- **Show** what you are talking about

  (such as objects or pictures).

Show what you are talking about

- **Use things from home** (e.g. photographs) to add meaning to your message. If the person with aphasia is still in hospital, bring **photo albums** from home. This can help with conversations.

Patience, Listening and Communicating with Aphasia (18 minutes)

Aphasia – A Guide for Friends Aphasia – A Guide for Spouses and Older Children

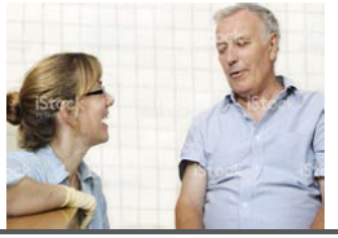
Speech Problems: Dysarthria

Dysarthria (dis-AR-three-a) is caused when some of the **speaking muscles are paralysed** from the stroke.

Dysarthria may affect these muscle areas:

- **Face**
- **Tongue**
- **Throat**
- **Mouth**

Dysarthria means slurred speech



If you have dysarthria, **your speech may be slurred and slow**. Your **voice** may also be **soft or breathy**.

One side of your **face** may be **drooped**. Saliva may escape from the corner of your mouth. Both of these things are because of the paralysed muscles.

It may be **hard to eat** because of your weak face muscles.

If you have dysarthria, your speech pathologist may give you **exercises** to do. This is to help **strengthen** the weakened **muscles**.

Dysarthria Speech Therapy

Speech Planning Difficulties: Verbal Dyspraxia

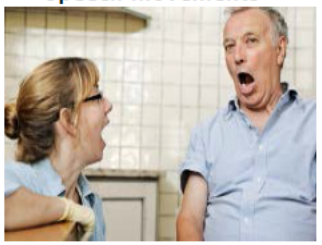
Verbal dyspraxia is a type of communication problem.

People with verbal dyspraxia have problems with the **movements** needed for:

- **Speaking**
- **Planning**
- **Sequencing**
- **Initiating**

For example, people with mild verbal dyspraxia may put their **speech sounds** in the **wrong order.**

Apraxia is a problem with planning speech movements



Aphasia and Apraxia

Swallowing Difficulties: Dysphagia

A stroke can cause **weak muscles** in the **face** and **throat**.

If this happens, you may have **difficulty swallowing**.

This is called **dysphagia** (dis-FAY-ja).

You may **cough** or **choke** when you try to eat and drink.

This can be frightening and dangerous.

There is another **danger** if you have swallowing problems.

When you try to **eat food** or **drink liquids**, it may go straight i**nto your lungs**. This is called **aspiration**.

It can cause a **chest infection** and make you very sick.

Listen carefully to what the **staff tell you** about eating and drinking.

Dysphagia means difficulty swallowing

You may cough or choke when eating or drinking

Dysphagia can cause a chest infection

Help with Dysphagia

You may need to have **thickened fluids.**

These can be **easier to swallow** and less likely to go into your lungs.

You may need to have **special food or a modified diet.**

Soft food, like scrambled eggs, and pureed food is often **easier to chew** and **swallow.**

Swallowing problems may get better.

But, it might take some time.

Most people who have had a stroke are on a **normal diet** by the time they leave hospital.

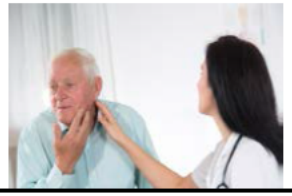
Your speech pathologist will do some **tests** to **check your swallowing.**

Your speech pathologist may help you with **exercises** and **advice.**

You may need thickened fluids

You may need a modified diet

You may need swallowing tests



Other Resources and Further Information

Further information can be found at the following **websites:**

- **The Australian Aphasia Association (www.aphasia.org.au/)**
- **The Australia Aphasisa Rehabilitation Pathway (www.aphasiapathway.com.au/)**
- **The Aphasia Channel (https://www.youtube.com/channel/UCEf4VG6GMEjhFyFobPbXNWg)**
- **National Stroke Foundation (https://strokefoundation.com.au/)**

Further information can be found in the following **books/guides**:

- **My Stroke Journey (National Stroke Foundation)**
- **Living with Aphasia – A Guide for Carers**
- **The Australian Aphasia Guide**

References and Acknowledgements

The following sources were helpful in developing this resource:

- **"What You Need to Know about Stroke" Developed by Dr Tammy Hoffmann**
- **Professor Linda Worrall, Dr Emma Power and Dr Tanya Rose**
- **The Australian Aphasia Association**
- **The Australian Aphasia Rehabilitation Pathway**

If you have any **questions about the content** in the booklet, please speak to your **speech pathologist.**

Appendix D-6. Chapter 7, Medical Record Audit

Implementation Audit

Date of File Audit: _____ | **Patient Study Code: _____**
See below for format e.g., IA-PRE-01

Section 1. GENERAL INFORMATION

Date of admission to hospital: .....
Date of initial contact by speech pathologist: .....
Date aphasia identified/documented in file: .....
Type/severity of aphasia (if documented): .....
Did patient have any premorbid aphasia? .....

Section 2. INFORMATION PROVISION

1. Was information provision documented by speech pathologist? ☐ Yes# ☐ No*
If yes, proceed to question 2
* If no, proceed to question Section 4

2. How many times was information provided (*as documented by speech pathologist*)? (*Please specify a number*) _____

For each occasion/date of information provision, please complete the following (there are extra sheets at the end of the audit tool if required)

Occasion 1: a) Date of information provision: _____

b) What was documented by speech pathologist? (*Please copy exactly as written*)
_____
_____
_____
_____

c) Who did the speech pathologist provide information to? (*Can select more than one*)
☐ Patient ☐ Family/Carer ☐ Friend/s ☐ Not stated ☐ Other _____

d) How was information provided? *(Can select more than one)*
☐ Verbally
☐ Written – with pictures ☐ Written – without pictures
☐ Not stated

e) What topics was information provided about? (*Select any that apply*)
☐ Aphasia – what is aphasia? ☐ Stroke
☐ Tips for communication ☐ Word-finding strategies
☐ Rehabilitation/recovery ☐ Aphasia support/groups
☐ Other (Please specify) _____

f) Was the information tailored? ☐ Yes* ☐ No ☐ Unsure/Not stated
*If Yes, specify how the information was tailored? _____
_____
_____

Occasion 2: a) Date of information provision: _____

b) What was documented by speech pathologist? (*Please copy exactly as written*)

_____

_____

_____

_____

d) Who did the speech pathologist provide information to? (*Can select more than one*)

☐ Patient ☐ Family/Carer ☐ Friend/s ☐ Not stated ☐ Other _____

d) How was information provided? *(Can select more than one)*

☐ Verbally

☐ Written – with pictures ☐ Written – without pictures

☐ Not stated

e) What topics was information provided about? (*Select any that apply*)

☐ Aphasia – what is aphasia? ☐ Stroke

☐ Tips for communication ☐ Word-finding strategies

☐ Rehabilitation/recovery ☐ Aphasia support/groups

☐ Other (Please specify) _____

f) Was the information tailored? ☐ Yes* ☐ No ☐ Unsure/Not stated

*If Yes, specify how the information was tailored? _____

_____

_____

Occasion 3: a) Date of information provision: _____

b) What was documented by speech pathologist? (*Please copy exactly as written*)

_____

_____

_____

_____

e) Who did the speech pathologist provide information to? (*Can select more than one*)

☐ Patient ☐ Family/Carer ☐ Friend/s ☐ Not stated ☐ Other _____

d) How was information provided? *(Can select more than one)*

☐ Verbally

☐ Written – with pictures ☐ Written – without pictures

☐ Not stated

e) What topics was information provided about? (*Select any that apply*)

☐ Aphasia – what is aphasia? ☐ Stroke

☐ Tips for communication ☐ Word-finding strategies

☐ Rehabilitation/recovery ☐ Aphasia support/groups

☐ Other (Please specify) _____

f) Was the information tailored? ☐ Yes* ☐ No ☐ Unsure/Not stated

*If Yes, specify how the information was tailored? _____

_____

_____

Section 3. COLLABORATIVE GOAL-SETTING

1. Were patient goals documented by speech pathologist? ☐ Yes# ☐ No*
If yes, proceed to next question
* If no, proceed to Section 4

2. How were patient goals identified? (*Please record exactly what was written, e.g., "Patient agreed with the gaols"*)

_____
_____
_____
_____

☐ Collaboratively with patient
☐ Collaboratively with family/carer
☐ Independently by speech pathologist and/or other health professionals
☐ Not stated
☐ Other _____

2. What date/s was goal-setting documented?

_____

3. Were goals revised or revisited? ☐ Yes* ☐ No ☐ Unsure/Not stated
*If Yes, specify how long after initial goal-setting? _____
_____

3. Were patients/families given a copy of the goals?
☐ Yes ☐ No ☐ Unsure/Not stated

4. How many goals were recorded? (*Please specify a number*) _____

5. What were the patient goals? (*Exactly as documented by speech pathologist*)

_____
_____
_____

Section 4. DISCHARGE INFORMATION

Date of discharge from acute speech pathology: _____
Total occasions of service by acute speech pathologist: _____
Date of discharge from stroke unit: _____
Discharge destination: ☐ Rehabilitation unit ☐ Transitional Care unit ☐ Home ☐ RACF

Patient Criteria

Admission with new cerebral event/stroke
Presence of aphasia identified by speech pathologist

Appendix D-7. Chapter 7, Case Encounter Checklist

Site ID: SP ID: Pt ID: Encounter #

Case Encounter Checklist (to be completed by speech pathologist)

Date of Encounter: __/__/____	Patient Date of Admission: __/__/____	Patient Age: _____ years	Patient Sex: M ☐ F ☐

Is this the first time you have seen this patient during the data collection period? Yes ☐ No ☐	Patient has aphasia? Yes ☐No ☐ (*If NO, stop here*)

Patient meets eligibility criteria? (see overleaf): Yes ☐No ☐(*If NO, stop here*)	Date of onset of aphasia? __/__/____

What aspects of patient management did you undertake for this patient's APHASIA at this visit? (Please tick all that apply):
(The list below contains techniques that are commonly used by speech pathologists; please tick all that apply, or add to the list, as relevant to you. Note: this list is not intended to be comprehensive or guide treatment, it is simply a way of documenting techniques employed)

* Assessment of language ☐
* Collaborative goal setting: with patient ☐with carer/family member ☐
* Verbal education/information provision: to patient ☐to carer/family member ☐
(*Please specify topics of information provided*)
Stroke ☐ Aphasia ☐
Tips for communication ☐ Word-finding strategies ☐
Rehabilitation/recovery ☐ Aphasia support/groups ☐
* Written education/information provision: to patient ☐to carer/family member ☐
(*Please specify how information provided*)
Aphasia-friendly with pictures ☐
Aphasia-friendly without pictures ☐
(*Please specify topics of information provided*)
Stroke ☐ Aphasia ☐
Tips for communication ☐ Word-finding strategies ☐
Rehabilitation/recovery ☐ Aphasia support/groups ☐
Counselling/support: to patient ☐to carer/family member ☐
* Intervention/therapy to improve aphasia ☐
(*Please specify types of intervention provided*)
Semantic feature analysis ☐ Sentence Processing ☐
Functional therapy tasks ☐ Auditory comprehension ☐
Naming therapy ☐ Constraint-Induced Language Therapy ☐

* Conversation partner training provided: to carer/family member ☐to staff member ☐
* Supported conversation techniques provided: to patient ☐to family member ☐to staff member ☐
Other 1 ☐(*Please specify*) ……..
Other 2 ☐(*Please specify*) …….

Appendix D-8. Chapter 7, Behavioural Constructs Survey

Date of Completion: Participant Code e.g., IA-PRE-01:

Survey: Factors influencing speech pathologists' practice

Introduction and Instructions

This survey aims to determine the factors that influence your practice in relation to aphasia management in the acute setting.

Questions relate specifically to two areas of practice: Goal Setting and Information Provision. The recommendations are taken from the Australian Clinical Guidelines for Stroke Management (National Stroke Foundation, 2010).

Please take the time to think about each question and respond about your practice in the ACUTE setting only.

Section 1: Demographic information

Please complete the following information.

1. What is your age? ……
2. Are you male or female? …….
3. How many years have you practiced as a speech pathologist? …….
4. Currently what speech pathology practice areas do you work in? (Please tick the boxes below that apply)
   - ☐ Inpatient rehabilitation
   - ☐ Inpatient acute
   - ☐ Outpatient rehabilitation
   - ☐ Other, please specify ……

Section 3: Goal setting

Here are the National Stroke Foundation guideline recommended practices:

Health professionals should collaboratively set goals for patient care. Goals should be prescribed, specific and challenging. They should be recorded, reviewed and updated regularly. The stroke team should meet regularly with the patient and their family/carer to involve them in management, goal setting and planning for discharge.

So the key points are: Involving patients in their management by setting collaborative, specific and challenging goals and updating them regularly.

Current Practice:
In the acute setting, to what extent do you consider that you comply with the recommended practices for goal setting? ….. (%)

To what extent do you agree with the following statements? Please circle your responses.

Statements	**Strongly Disagree**	**Disagree**	**Neither Agree nor Disagree**	**Agree**	**Strongly Agree**
I find it difficult to set collaborative, challenging and relevant goals with patients with aphasia.	1	2	3	4	5
I intend to set collaborative goals for each patient with aphasia.	1	2	3	4	5
My colleagues never collaboratively set goals with people with aphasia.	1	2	3	4	5
I believe setting collaborative goals and updating them regularly with patients with aphasia will improve patient outcomes.	1	2	3	4	5
I have insufficient time to involve the patient with aphasia in their management.	1	2	3	4	5
My team meets regularly to collaboratively review the goals of people with aphasia.	1	2	3	4	5

If I offer to set collaborative goals with patients with aphasia they will be appreciative of me.	1	2	3	4	5
I have encountered problems when trying to involve patients with aphasia in their management, specifically in setting goals.	1	2	3	4	5
It is a goal of my team to set collaborative goals with patients with aphasia.	1	2	3	4	5
At my workplace, there are strategies available to involve patients with aphasia in their goal setting.	1	2	3	4	5
Patients often wish to be involved in their management, particularly in goal setting.	1	2	3	4	5
Other demands often prevent me from setting collaborative goals with patients with aphasia.	1	2	3	4	5
Other healthcare professionals encourage me to set collaborative goals with patients with aphasia.	1	2	3	4	5
I am confident setting collaborative, specific and challenging goals for aphasic patient care.	1	2	3	4	5
I believe collaborative goal setting will upset patients with aphasia.	1	2	3	4	5
I have a strategy about how to facilitate collaborative goal setting for aphasic patient care.	1	2	3	4	5
There are reasons why I do not involve the patient with aphasia in goal setting.	1	2	3	4	5
I do not have the resources to set goals with people with aphasia.	1	2	3	4	5

Do you have any other comments in relation to goal setting with people with aphasia in the acute setting?

_____

_____

_____

_____
_____
_____

Section 4: Information provision

Here are the National Stroke Foundation guideline recommended practices:

All stroke survivors and their families/carers should be offered information tailored to meet their needs using relevant language and communication formats. In patients with aphasia, all written information on health, aphasia, social and community supports should be available in an aphasia-friendly format. Information should be provided at different stages in the recovery process. Stroke survivors should be provided with routine, follow-up opportunities for clarification or reinforcement of the information provided.

So the key points are: Stroke survivors and families/carers should be offered information tailored to their needs (aphasia-friendly) throughout all stages of the recovery process.

Current Practice:
In the acute setting, to what extent do you consider that you comply with the recommended practices for information provision? ….. (%)

To what extent do you agree with the following statements? Please circle your responses.

Statements	**Strongly Disagree**	**Disagree**	**Neither Agree nor Disagree**	**Agree**	**Strongly Agree**
I have previously had difficultly offering aphasia-friendly information throughout all stages of recovery.	1	2	3	4	5
Guideline recommendations about offering aphasia-friendly information are readily available.	1	2	3	4	5
There is often something more urgent to complete than offering individually tailored information to people with aphasia and their families.	1	2	3	4	5
I think providing people with aphasia with tailored information is a waste of time because they will not understand it.	1	2	3	4	5

I believe offering aphasia-friendly information to patients and their families will disappoint them.	1	2	3	4	5
Offering aphasia-friendly information is not a priority for me.	1	2	3	4	5
My motivation to offer education through aphasia-friendly information to patients is strong.	1	2	3	4	5
I find it challenging to provide aphasia-friendly information.	1	2	3	4	5
I always intend to offer aphasia-friendly information throughout all stages of recovery.	1	2	3	4	5
Other healthcare professionals are supportive of offering aphasia-friendly information.	1	2	3	4	5
I have inadequate time to tailor resources to each individual patient with aphasia.	1	2	3	4	5
Patients with aphasia and their families want aphasia-friendly information.	1	2	3	4	5
I have the necessary resources to provide patients and families with aphasia-friendly information.	1	2	3	4	5
I am confident providing tailored information to patients with aphasia.	1	2	3	4	5
I am working towards offering aphasia-friendly information to all patients and their families.	1	2	3	4	5
Evidence is inconsistent about offering aphasia-friendly information to patients.	1	2	3	4	5
My colleagues always offer aphasia-friendly information throughout all stages of a patient's recovery.	1	2	3	4	5

I feel that providing aphasia-friendly information is an effective way to educate patients and their families.	1	2	3	4	5
My team always intend to offer aphasia-friendly information.	1	2	3	4	5
Other priorities prevent me from being able to provide aphasia-friendly information.	1	2	3	4	5
I am familiar with the evidence for offering aphasia friendly-information throughout all stages of the recovery process.	1	2	3	4	5

Do you have any other comments in relation to education and information provision to people with aphasia in the acute setting?

Appendix D-9. Chapter 7, Intervention Delivery Fidelity Checklist

Site code

Delivery checklist

Session details

Intervention Arm			
Date of delivery		Name of session provider(s)	
Mode of delivery			
Attendance/consent sign in sheet used?		Any refusals of consent?	
Audio recording?			
Were there any handouts? What were they?			

Intended start time		Intended end time		Intended duration of session	
Actual start time		Actual end time		Actual duration of session	

Monitoring details

Date log sheet was completed		Name of evaluator	
How monitoring was conducted	❑ Audio recording of session ❑ Self-reported coding sheet completed by provider		

Attendance

Number of participants – total (may vary during session)	
Participants' roles – number of types of roles (data available from sign-in/consent sheet)	
Any other non-participant attendees (AAIMS staff, uninvited agency staff, etc)	
How many participants completed the pre-workshop survey?	

Participants contributed to discussion	*All | ~ 3/4 | ~ 1/2 | ~ 1/4 | Few | None*
Participants' contributions included knowledge/examples from their own experience	*Extensive | Moderate | Limited | Not at all*
Discussion included how info/learning from the session might be applied in their setting	*Extensive | Moderate | Limited | Not at all*
Participants discussed some change goals	Y / N

Other notes

Any changes to the above plan?	Y N	What and why?	

Any pre or post forum activities?	Y N	Did they occur as planned?	

Comments

Goal Setting and Identification of Strategies

Agreed Target	
Strategies	

Informal Feedback/Comments made by participants throughout session

Appendix D-10. Chapter 7, Post Study Focus Groups Topic Guide

Post-intervention focus groups

Introduction

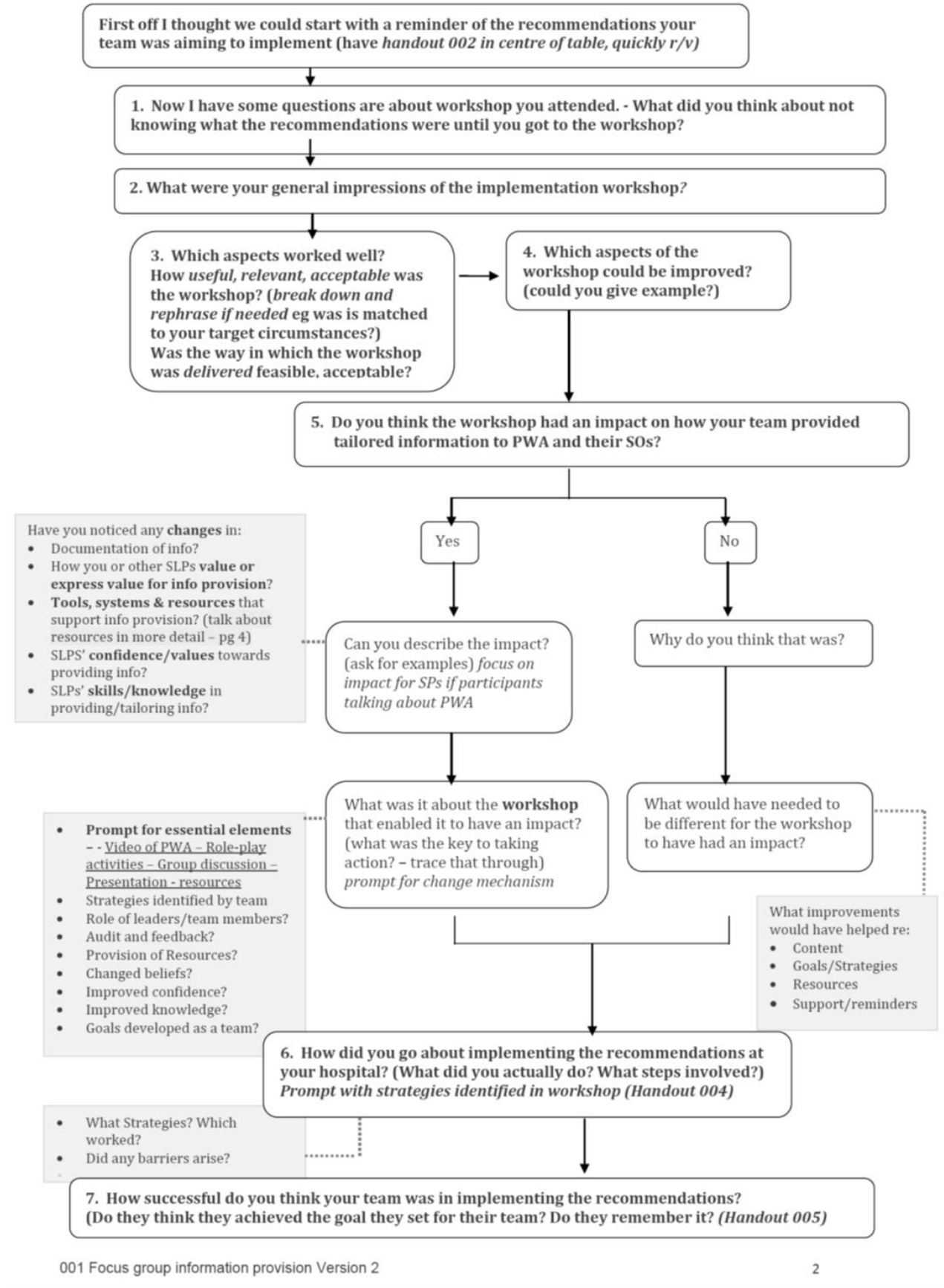
- Thank participants for taking part in research
- Introduce researcher/s - KS Skyping in
- Explain the purpose of the research:
    - I would like to talk to you about your experiences of participating in the AAIMS – Acute aphasia implementation study. This study had 3 parts: 1. A workshop that aimed to improve your implementation of the recommendation associated with providing tailored information to people with aphasia 3. An Implementation phase – where you implemented the recommendations and collected data for 12 weeks. 3. A follow-up evaluation of practice, including a process evaluation to explore how the implementation program worked (or didn't work) in each team. This is what we are doing today.

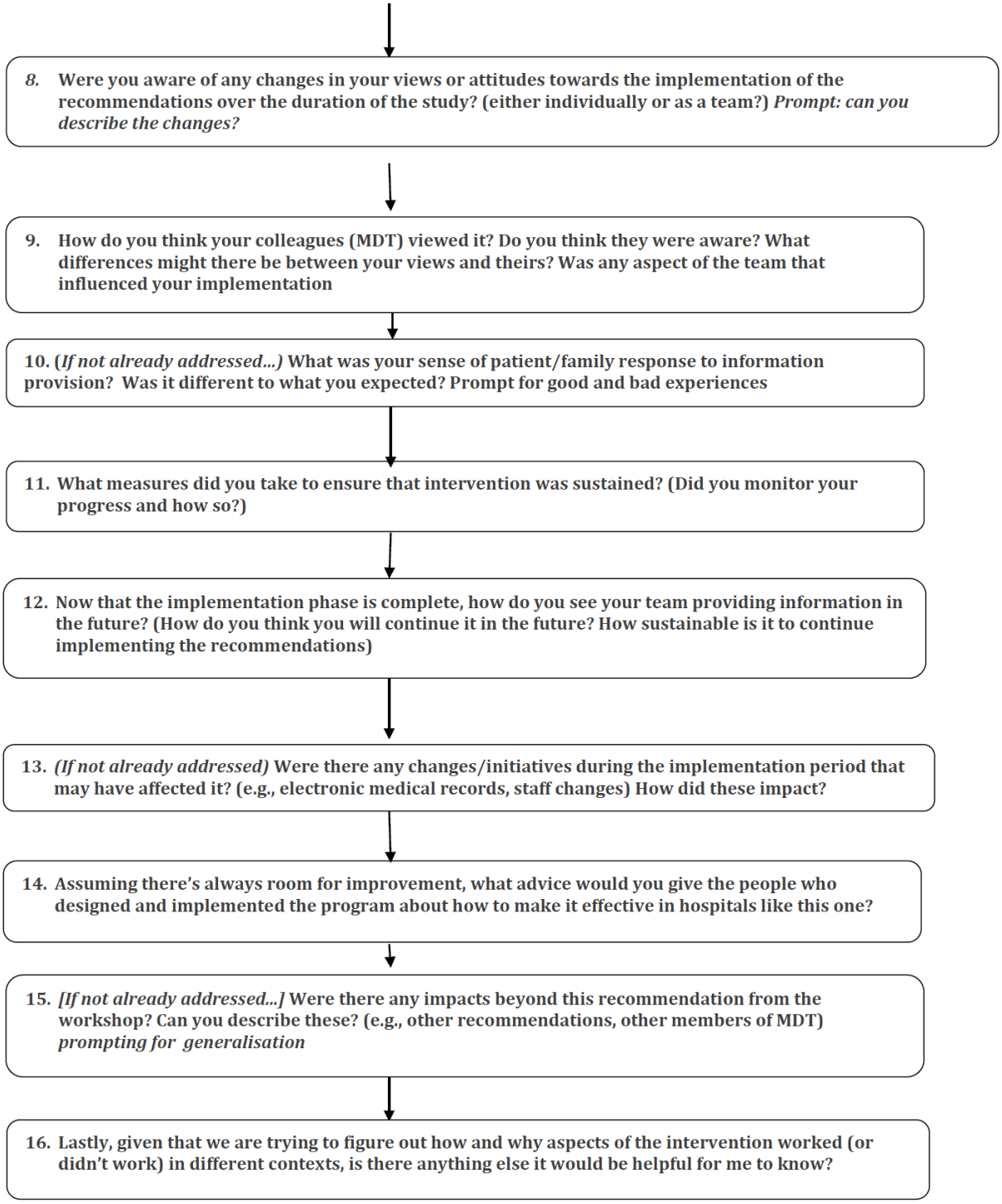
- Explain focus group process:
    - Will probably go for 90 mins (establish if want a break or separate into 2 session) depending on how much discussion arises
    - If at any point you would like to take a break, just let me know
    - Interview will be recorded for transcription purposes – de-identified
    - Researcher will take some notes during the interview to keep track of the main points
    - Explain importance of wanting to understand the experiences and perspectives of those who participated in the study + things that were challenging
    - Then there's some other things to cover/check off (referring to opinions about resources etc)

- Do you have any questions for me/us at this stage?

Introduction of focus group participants

- State study ID number (*go around the room*) and name


First off I thought we could start with a reminder of the recommendations your team was aiming to implement (have *handout 002 in centre of table, quickly r/v)*
1. Now I have some questions are about workshop you attended. - What did you think about not knowing what the recommendations were until you got to the workshop?
2. What were your general impressions of the implementation workshop?
3. Which aspects worked well? How *useful, relevant, acceptable* was the workshop? (*break down and rephrase if needed* eg was is matched to your target circumstances?) Was the way in which the workshop was *delivered* feasible, acceptable?
4. Which aspects of the workshop could be improved? (could you give example?)
5. Do you think the workshop had an impact on how your team provided tailored information to PWA and their SOs?
Have you noticed any **changes** in:
• Documentation of info?
• How you or other SLPs **value or express value for info provision**?
• **Tools, systems & resources** that support info provision? (talk about resources in more detail – pg 4)
• SLPS' **confidence/values** towards providing info?
• SLPs' **skills/knowledge** in providing/tailoring info?
Yes
No
Can you describe the impact? (ask for examples) *focus on impact for SPs if participants talking about PWA*
Why do you think that was?
What was it about the **workshop** that enabled it to have an impact? (what was the key to taking action? – trace that through) *prompt for change mechanism*
What would have needed to be different for the workshop to have had an impact?
• **Prompt for essential elements** – - Video of PWA – Role-play activities – Group discussion – Presentation - resources
• Strategies identified by team
• Role of leaders/team members?
• Audit and feedback?
• Provision of Resources?
• Changed beliefs?
• Improved confidence?
• Improved knowledge?
• Goals developed as a team?
What improvements would have helped re:
• Content
• Goals/Strategies
• Resources
• Support/reminders
6. How did you go about implementing the recommendations at your hospital? (What did you actually do? What steps involved?) *Prompt with strategies identified in workshop (Handout 004)*
• What Strategies? Which worked?
• Did any barriers arise?
7. How successful do you think your team was in implementing the recommendations? (Do they think they achieved the goal they set for their team? Do they remember it? *(Handout 005)*
001 Focus group information provision Version 2
2


8. Were you aware of any changes in your views or attitudes towards the implementation of the recommendations over the duration of the study? (either individually or as a team?) Prompt: can you describe the changes?
9. How do you think your colleagues (MDT) viewed it? Do you think they were aware? What differences might there be between your views and theirs? Was any aspect of the team that influenced your implementation
10. (If not already addressed...) What was your sense of patient/family response to information provision? Was it different to what you expected? Prompt for good and bad experiences
11. What measures did you take to ensure that intervention was sustained? (Did you monitor your progress and how so?)
12. Now that the implementation phase is complete, how do you see your team providing information in the future? (How do you think you will continue it in the future? How sustainable is it to continue implementing the recommendations)
13. (If not already addressed) Were there any changes/initiatives during the implementation period that may have affected it? (e.g., electronic medical records, staff changes) How did these impact?
14. Assuming there's always room for improvement, what advice would you give the people who designed and implemented the program about how to make it effective in hospitals like this one?
15. [If not already addressed...] Were there any impacts beyond this recommendation from the workshop? Can you describe these? (e.g., other recommendations, other members of MDT) prompting for generalisation
16. Lastly, given that we are trying to figure out how and why aspects of the intervention worked (or didn't work) in different contexts, is there anything else it would be helpful for me to know?

Focus Group – Feedback on resources provided

Now we would like some specific feedback about the resources you used in the implementation of the recommendations. You may recall you were provided with a 'cheat sheet' of resources.

1. **Did you use the cheat sheet? Why/why not?** ***(Show cheat sheet with pictures – 006)***

2. **Which of these resources, if any, did you use in the implementation period?** ***(Show cheat sheet with pictures – 006)***

2a. ***(If none of the ones provided for the study)*** **What resources did you use? Why did you choose to use those rather than those provided?**

3. **Why did you choose to use that/those resources? What did you like about them?** ***(Prompt – probe each one further and reflect back to group to get further thoughts)***

4. **How often did you use those resources you mentioned? (all the time? Only for some people? How did you decide? What factors influenced your decision?**

5. **What do you look for in a resource to provide information to people with aphasia and/or their carers? What would meet your needs?**

6. **Show the interactive PDF "What's happening to me now?" – Let's talk about this resource in more detail. Did anyone use this resource with any patients with aphasia (why/why not?)**

What do you think about: (if not already answered)

- **Acceptability** – to pts and themselves?
- **Useability?** (did it meet the needs of SLPs and patients/carers?)
- **Feasibility?** (of using on the wards, any technology barriers?)
- **Content** – language used, amount of text/information, relevance
- **Design** – font, layout, format, colour, graphics
- **What could be improved?**

7. **What did you think patients/families thought about the interactive PDF 'What's happening to me now?'? (or, if not used, what do they THINK patient's perspectives would be?**
   - **What elements did they seem to like?**
   - **What elements didn't they like?**

6. **Thinking at all the resources we've spoken about (? Include extra ones they suggested) – which did you prefer the most? ASK TO RANK PREFERENCE**

7. **Any other feedback or suggestions for an acceptable, useful resource that SPs can use to provide information to people with aphasia and/or their carers?**